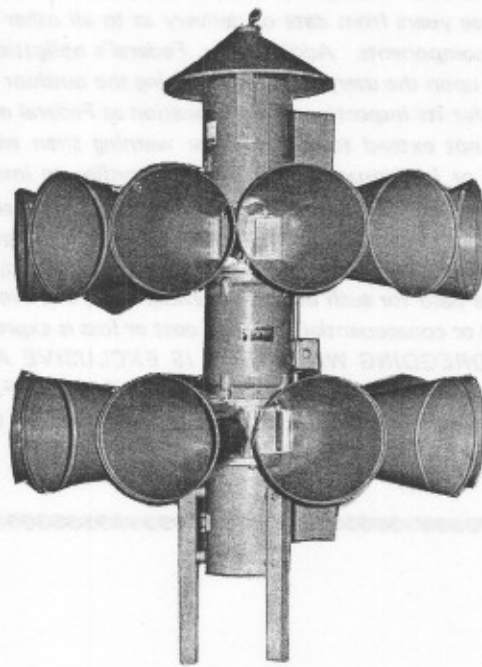




**SIGNAL DIVISION**  
Federal Signal Corporation

## **2T22 and 3T22**

### **SIREN**



**Models: 2T22A, 2T22B, 3T22A, 3T22B**

## **Service Manual**

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## Warranty

Federal Signal Corporation (Federal) warrants outdoor warning sirens of its manufacture to be free from defective material and workmanship at the time of delivery to the user. Federal will repair or replace, without charge to user other than transportation, removal and reinstallation costs, any of its outdoor warning sirens and controls, or part thereof which Federal shall determine, in its sole discretion, to be defective in material or workmanship provided written notice of such defect shall have been given to Federal within two years from the date of delivery as to such defects in electrical components, such as motors and controls, and within three years from date of delivery as to all other such defects, such as mechanical components. Additionally, Federal's obligations hereunder shall be conditioned upon the user, at its cost, making the outdoor warning siren available to Federal for its inspection at such location as Federal may designate. This warranty shall not extend to any outdoor warning siren which has been improperly installed or inadequately maintained according to instructions supplied by Federal or which has been subjected to misuse, negligence, accident, tampering or alteration. The sole remedy for breach of the foregoing warranty shall be repair or replacement as aforesaid, or in Federal's sole judgment, refund of the purchase price paid for such outdoor warning siren, and every other form of liability for direct or consequential damages, cost or loss is expressly excluded or denied. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE AND OF ANY OTHER TYPE, WHETHER EXPRESS OR IMPLIED.



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## SECTION I

### GENERAL DESCRIPTION

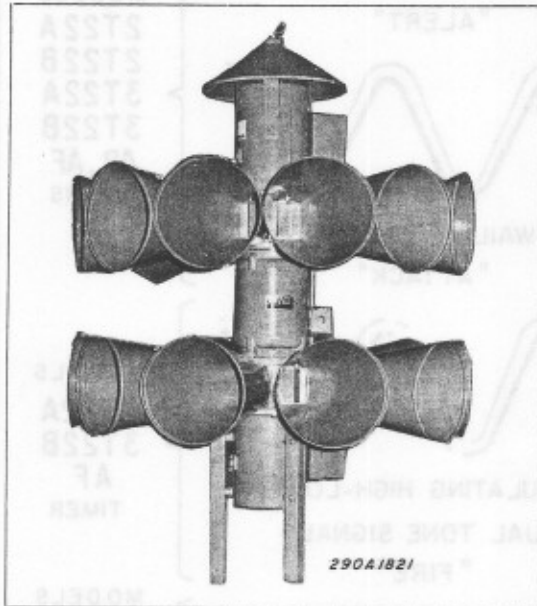


Figure 1-1. Model 2T22 Vertical Siren.

#### 1-1. GENERAL.

The Federal Models 2T22, and 3T22 Sirens (figure 1-1) are omnidirectional, general alarm sirens that are capable of producing high intensity warning signals over a large area. The output sound level of both siren models is 113dB at 100 feet (30.5m). Both siren models produce a distinctive sound that is readily distinguishable from other warning signals such as vehicle sirens. Federal can provide mounting hardware that enables the user to install the 2T22 or 3T22 in almost any situation. The high efficiency of these siren models enables them to produce a high sound level while making moderate demands on the power source.

#### 1-2. SIREN DESCRIPTION.

##### A. Model 2T22 Description.

The Model 2T22 Siren consists of three major assemblies; the Motor Assembly, the Upper Intake Tube Assembly and the Lower Intake Tube Assembly.

The Motor Assembly consists of a vertically installed motor having a drive shaft that extends from each end. A stator and rotor are mounted on each end of the motor. The stators are attached to the

motor housing and the rotors are mounted on the drive shaft concentric to the stators. Each rotor-stator combination contains a different number of ports. As the motor rotates the rotors, air is drawn through the upper and lower intake tubes and passes through the rotor and stator ports in pulses. These pulses are produced because the rotor alternately opens and closes the stator ports. The pulses of air produce sound at a frequency that is dependent on the instantaneous rotational speed of the rotor, and the number of ports in each rotor and stator. The rotor-stator combination mounted on top of the motor has twelve ports, and the bottom rotor-stator combination has ten ports. As a result the upper rotor-stator produces a higher frequency than the lower rotor-stator. Twenty two megaphonic horns are attached to the stators, one at each port, to project the sound to the surrounding area.

The Upper Intake Tube Assembly consists of an intake tube, an air intake screen, a conical dome, a hoisting bracket and an eyebolt. The hoisting bracket is mounted on the intake tube so that the bracket supports the dome. The dome is held on the hoisting bracket by the eyebolt. The eyebolt also provides a convenient lifting point when it is necessary to hoist the siren. The air intake screen is installed around the inner circumference of the intake tube. This screen prevents obstructions from entering the siren.

The Lower Intake Tube Assembly consists of an intake tube similar to the one used in the Upper Intake Tube Assembly, and an air intake screen. The air intake screen prevents obstructions from entering the intake tube.

The legs provide support for the siren. The brace plate is attached to the legs approximately half way up the length of the legs.

##### B. Model 3T22 Description.

The Model 3T22 Siren is similar to the Model 2T22 except that two Code Mechanism Assemblies are added to the sirens. One Code Mechanism Assembly



is mounted on the upper intake tube and the other identical assembly is attached to the lower tube. Each coding mechanism consists of a solenoid-operated damper plate that controls the flow of air into its respective rotor and stator by opening or closing the air intake tube. These two coding mechanisms make it possible for the sirens to produce coded signals.

### 1-3. SIGNAL DESCRIPTION.

The Models 2T22A (3 phase) and 2T22B (single phase) sirens are capable of producing a steady dual-tone and a wailing dual tone signal. The frequency of the tones that comprise these signals have a ratio of 6:5. For example, if the frequency of the higher-pitched tone at a given time is 600Hz, the frequency of the lower pitched tone is 500Hz. Both tones in each of the signals are produced simultaneously, lending a very distinctive sound to the siren warning signals. The steady signal is usually used as a Civil Defense "Alert" signal and the wailing signal is usually used as a Civil Defense "Attack" signal. These two signals are illustrated graphically in figure 1-2.

The Models 3T22A (3 phase) and 3T22B (single phase) Sirens are capable of producing coded signals as well as the same dual-tone signals as the Models 2T22A and 2T22B. As shown in figure 1-2, there are four possible coded signals. Some of the coded signals require the use of a specific timer. For example, a Federal Model AF Timer must be used if the steady, pulsed signal is desired. The ratio of the coded signals is 6:5. One of the coded signals is usually used as a "Fire" signal.

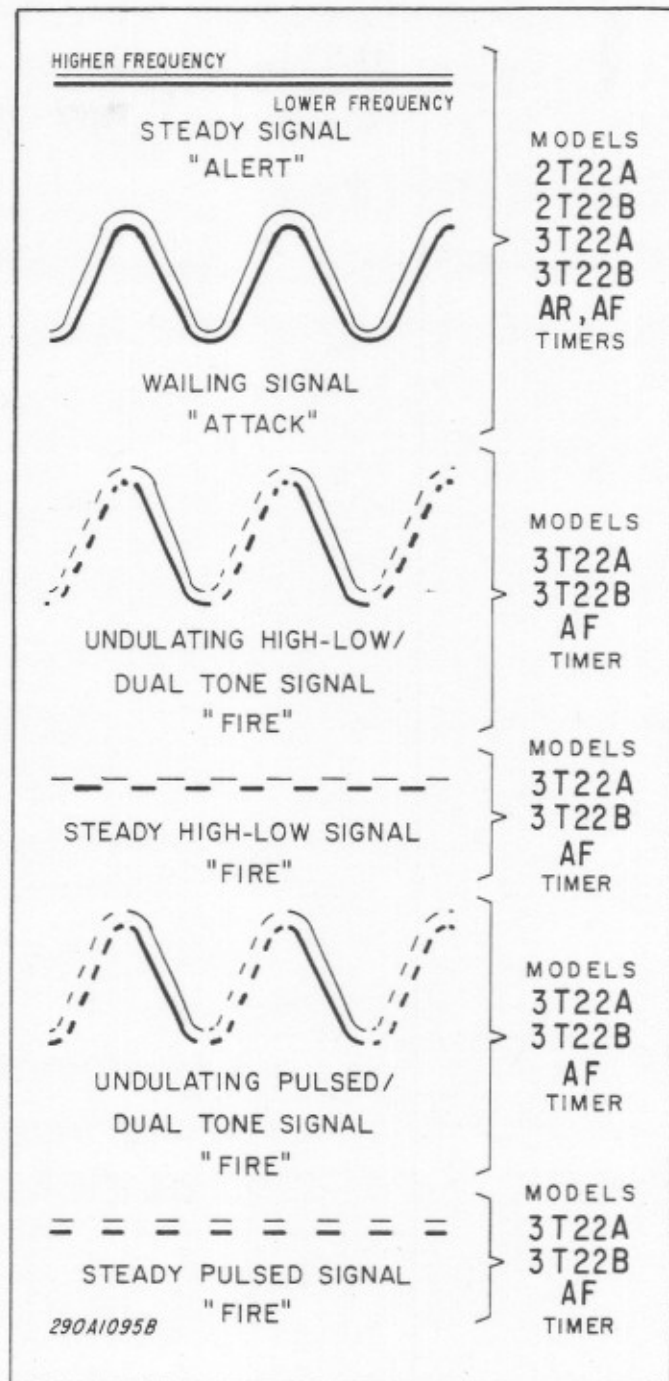


Figure 1-2. 2T22 and 3T22 Signal Characteristics.

## SECTION II

# SPECIFICATIONS

### 2-1. POWER REQUIREMENTS.

#### A. Motor

Model 3T22A . . . . .	208-240/480VAC, 3 phase, 50/60Hz, 20-28/11-14A.
Model 3T22B . . . . .	240VAC, 1 phase, 60Hz only, 52-58A.
Model 2T22A . . . . .	208-240/480VAC, 3 phase, 50/60Hz, 20-28/11-14A.
Model 2T22B . . . . .	240VAC, 1 phase, 60Hz only, 52-58A.

B. Solenoids (2) . . . . . 240Vac, 1 phase, 60Hz, 1.25A. each (seated)

### 2-2. PHYSICAL.

Diameter (all models) . . . . . 52" (122 cm) including projectors

#### Height (approx.)

Model 3T22A. . . . .	100" (254 cm)
Model 3T22B . . . . .	102" (259 cm)
Model 2T22A . . . . .	100" (254 cm)
Model 2T22B . . . . .	102" (259 cm)

#### Shipping Weight

Model 3T22A . . . . .	710 lb. (322 kg.)
Model 3T22B . . . . .	713 lb. (323 kg.)
Model 2T22A . . . . .	686 lb. (311 kg.)
Model 2T22B . . . . .	689 lb. (313K g.)

### 2-3. MISCELLANEOUS.

Sound Output . . . . . 113 dBC at 100 ft (30.5 m)

#### Frequency

High . . . . .	675Hz (60Hz) 563Hz (50Hz)
Low . . . . .	575Hz (60Hz) 479Hz (50Hz)

#### Motor

Type . . . . .	3 ph.: Squirrel Cage Induction, Dual voltage 208-240/480VAC 1 phase: Repulsion Induction, 240VAC
----------------	--

Power. . . . . 10HP

#### Control Cabinet

Dimensions (HWD) . . . . .	18" x 24" x 8" (45.7cm x 61cm x 20.3cm)
Weight . . . . .	75 lb (34 kg.)
Enclosure . . . . .	General Purpose, Weatherproof

## SECTION III

# INSTALLATION

### 3-1. SIREN LOCATION.

The information in this paragraph provides guidelines to aid the user in the selection of an installation site that makes the best possible use of the siren.

Careful consideration of the factors affecting the propagation of sound from the siren and the response of the human ear to the sound will optimize the ability of the siren to effectively warn the community.

The reduction of signal intensity as the distance from the siren increases, and the minimum desired signal level at the fringe of the area to be covered are important considerations when choosing a siren installation site. As the distance from the siren increases, sound level losses accumulate. These losses are a result of weather conditions, the terrain, obstructions in the sound path, the pitch of the sound and the height of the siren. Optimum sound propagation conditions exist when there are no obstructions in the sound path, the terrain is flat, and the air is calm. Under these conditions, each time the distance from the siren is doubled, the sound level decreases by approximately 8dB. For example, the sound level 100 feet (30.5m) from the siren is 113dB. At 200 feet (61m), the sound level drops to 105dB; at 400 feet (122m) the sound level drops to 97dB; etc. This is referred to as the "loss per distance doubled".

A loss per distance doubled of 8dB is seldom experienced. This is because buildings and other obstructions are frequently present in the sound path. In addition, the atmosphere is rarely calm, and the terrain may not be flat. As a result, a typical loss per distance doubled in residential areas may be 10dB, and as high as 12dB in areas having tall buildings.

Experience indicates that an individual with normal hearing will probably hear a warning signal whose intensity is at least as high as the ambient noise level. Experience has also shown that the ambient noise level in industrial districts is typically 90dB.

Therefore, for a person to hear a warning signal in an industrial area, the sound level intensity of that signal must also be approximately 90dB. In this situation, any point receiving a signal having less than 90dB intensity is considered to be outside the effective range of the siren.

In business districts an ambient noise level of 80dB is common and in residential areas, 70dB of ambient noise is typical. Assuming a 10dB loss per distance doubled and a 70dB minimum sound level, the effective range of a Model 2T22 or 3T22 siren is approximately 1680 feet (512m).

Wind speed and direction often affect the propagation of sound from the siren. Consequently, the direction of the prevailing wind may also be a factor to consider when selecting the installation site(s) of a small, one or two-siren system. For example, if the prevailing wind is from the west, it may be desirable to install the siren toward the western edge of the area to be covered.

Other factors to consider before selecting the installation site include the availability of electrical power, the ease of installation and maintenance, and the height of surrounding obstructions.

### 3-2. PHYSICAL INSTALLATION.

#### A. General.

Most Model 2T22 and 3T22 installations are one of two types; Pole Mount or Flat Surface Mount. These two configurations make it possible to install the 2T22 or 3T22 in almost any situation. If neither of the installations in this paragraph is suitable, modification of one of the configurations described may be practical.

A 2T22 or 3T22 is typically installed 35 to 40 feet (11m. to 12m.) above the ground. If the siren is less than 35 feet (11m.) above the ground, sound intensity at close range may increase but the effective range of the siren is reduced. Conversely, if the siren is located more



than 40 feet (12m.) above the ground, the effective range of the siren may increase, but the sound may skip over areas closer to the siren. These variables may make it desirable to test the siren sound coverage at various heights and locations whenever possible. ALWAYS insure that the air intakes are clear when the siren is being tested and when it is installed at its final location.

### B. Pole Mounting.

A typical 2T22 or 3T22 pole-mounted installation is shown in figure 3-1. The siren is mounted on a Class 2 utility pole 35-40 feet above the ground. The siren is attached to the pole by means of a stand that is provided by Federal. The stand consists of three legs and a brace plate. The brace plate is attached to the legs approximately half-way along the height of the legs. The brace plate insures that there is sufficient clearance between the top of the pole and the siren lower air intake. The clearance between the top of the pole and siren is necessary to allow sufficient air to enter the lower rotor and stator. If the space between the lower air intake tube and the top of the pole is not present, or is too small, the output sound level of the siren will be significantly impaired. In addition, the distinctive two-tone characteristic of the signal may be eliminated or reduced.

To install the 2T22 or 3T22 on a Class 2 utility pole, proceed as follows:

1. Install all screens and horns on the two stators, as indicated in figure 3-2. Use two 5/16"-18 x 1/4" hex head bolts, 5/16" lockwashers, and 5/16" - 18" hex nuts (all provided) to attach each horn and screen to the stators. Install one horn and screen at each stator port. When installing the horns, make sure that the seam in each faces down. This reduces the chance of water entering the seam and causing corrosion of the horn. There are 22 identical horns and screens; 12 for the top stator and 10 for the bottom stator.

2. Remove the bolts and short lengths of angle iron that hold the siren on the shipping base. Use a crane or hoist to lift the siren approximately 3-1/2 feet.

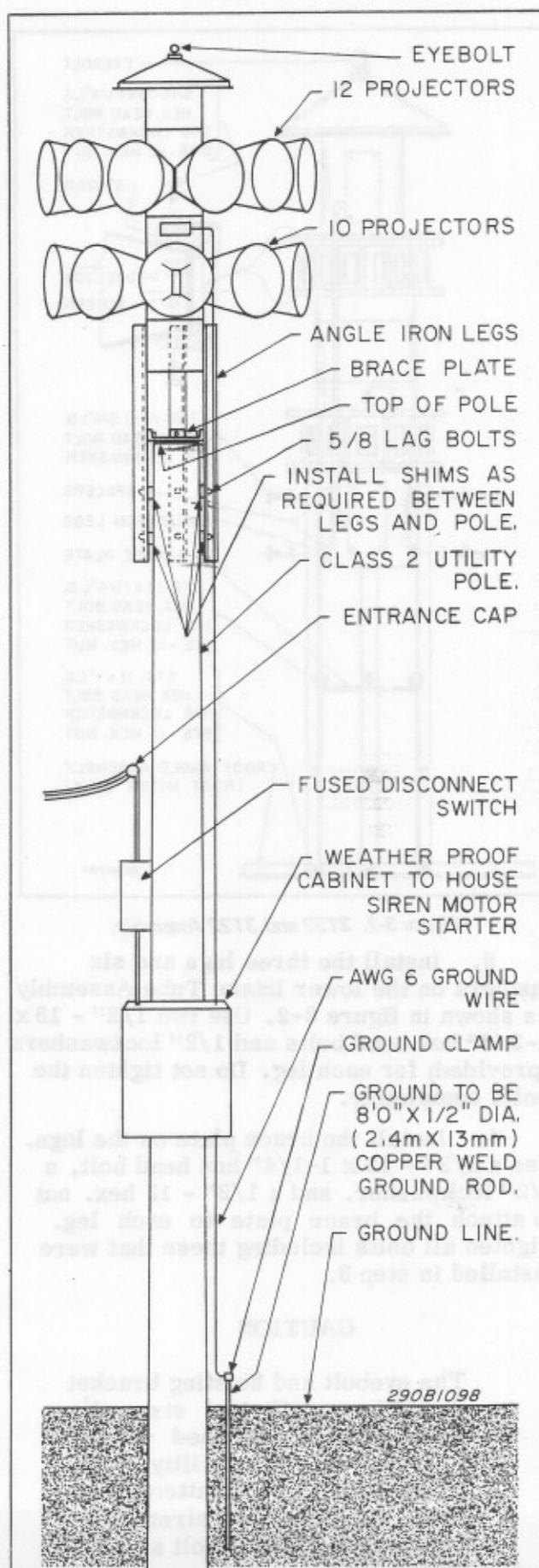


Figure 3-1. Pole Mounted Installation.



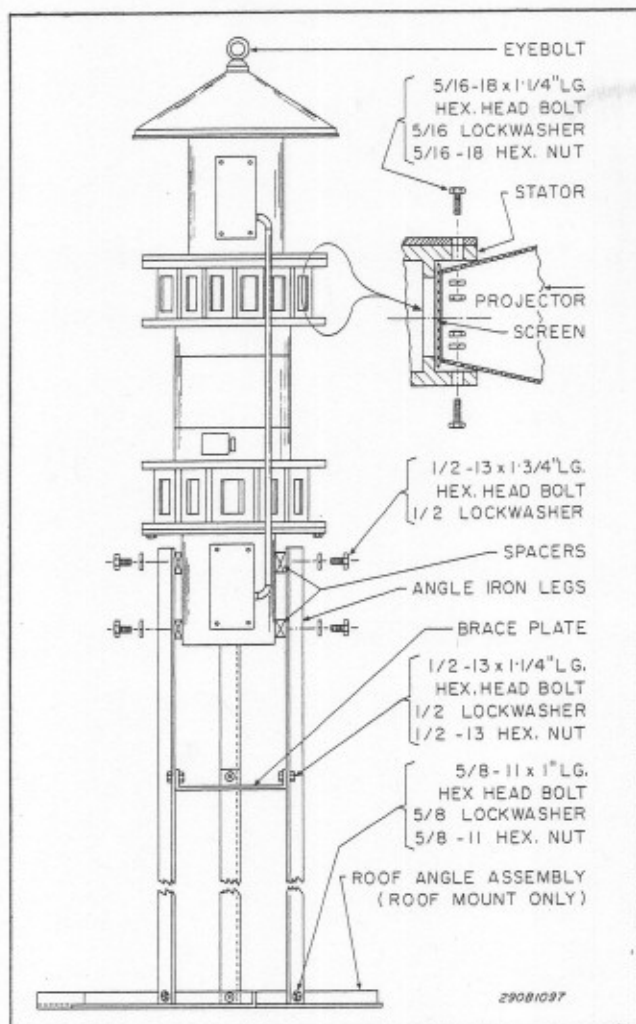


Figure 3-2. 2T22 and 3T22 Assembly.

3. Install the three legs and six spacers on the lower Intake Tube Assembly as shown in figure 3-2. Use two 1/2" - 13 x 1-3/4" hex head bolts and 1/2" lockwashers (provided) for each leg. Do not tighten the bolts completely.

4. Install the brace plate on the legs. Use a 1/2" - 13 x 1-1/4" hex head bolt, a 1/2" lockwasher, and a 1/2" - 13 hex. nut to attach the brace plate to each leg. Tighten all bolts including those that were installed in step 3.

#### CAUTION

The eyebolt and hoisting bracket do not have sufficient strength to support the combined weight of the siren and a utility pole. Therefore, do NOT attempt to erect the pole and siren together using the eyebolt as a lifting point.

5. Erect the Class 2 utility pole in accordance with accepted practice. Be sure that the pole extends about 33 feet above the ground (refer to CAUTION between steps 4 and 5 in this paragraph).

6. Raise the siren to the necessary height, and lower it over the pole so that the brace plate rests on the top of the pole (refer to CAUTION between steps 4 and 5 in this paragraph).

7. If necessary, insert shims between the siren legs and the pole. Bolt the siren legs to the pole using two 5/8" lag bolts, at least 4-inches long for each leg, as shown in figure 3-1.

8. Install the control cabinet or motor starter and disconnect switch in a location that is readily accessible to service personnel, but discourages vandalism. The control cabinet or motor starter must be installed in a vertical position for proper operation. A Model RC5 or RC5W Motor Starter is required to control a Model 2T22 Siren, and a Model RC6 Control Cabinet is required for a Model 3T22 Siren. Install the RC5 or RC6 in accordance with NEC recommendations.

#### C. Flat Surface Mount.

This installation configuration is practical when the installation site is on a flat roofed building. The siren can be anchored directly to the roof, on a platform as shown in figure 3-3, or on a weight distribution mat like the one shown in figure 3-4. When installing the siren on a flat roof, always be sure that the horns clear parapets or other obstructions by at least ten feet.

The siren is attached to the mounting surface by means of a stand that is provided by Federal. The stand consists of three angle iron legs, a brace plate, and a Roof Angle Assembly fabricated from angle iron. The roof angle assembly can be anchored directly to the mounting surface.

When the siren is installed on a flat roof, a weight distribution mat, like the one shown in figure 3-4, may be necessary. This mat is required when the siren mounting surface is unable to support weight in excess of 115 pounds per square foot (562 kg. per square meter).

Therefore, if the mounting surface cannot support more than 115 pounds per square foot (562 kg. per square meter), construct the weight distribution mat shown in figure 3-4. This mat distributes the siren weight to approximately 18 pounds per square foot (88 kg. per sq. m.). A weight distribution mat may be necessary if the siren is to be mounted on a platform.

To install the 2T22 or 3T22 on a flat roof or other flat surface, proceed as follows:

1. If desired, construct a platform for mounting the siren. The platform must be capable of supporting at least 750 pounds (338 kg.) and withstanding a siren wind load of 100 mph (160 kmph). Platform construction details are left to the builder. Locate the platform at the siren installation site, and anchor the platform to the mounting surface.

#### CAUTION

The eyebolt and hoisting bracket do not have sufficient strength to support the combined weight of the siren and a platform. Therefore, do NOT lift the siren and platform together using the eyebolt as a lifting point.

2. Install all screens and horns on the two stators as indicated in figure 3-2. Use two 5/16" - 18 x 1/4" hex head bolts 5/16" lockwashers and 5/16" - 18 hex nuts (all provided) to attach each horn and screen to the stators.

3. Remove the bolts and short lengths of angle iron that hold the siren on the shipping base. Use a crane or hoist to lift the siren approximately 3-1/2 feet.

4. Install the three legs on the Lower Intake Tube Assembly. Use two 1/2" 13 x 1-3/4" hex. head bolts and 1/2" lockwashers (provided) for each leg. Do not tighten the bolts completely.

5. Attach the brace plate to the legs. Do NOT tighten the bolts completely.

6. Install the roof angle assembly on the legs. Use one 5/8" - 11 x 1" hex head bolt, 5/8" lockwasher and 5/8" - 11 hex nut (provided) to attach each leg to the roof angle assembly. Tighten all bolts.

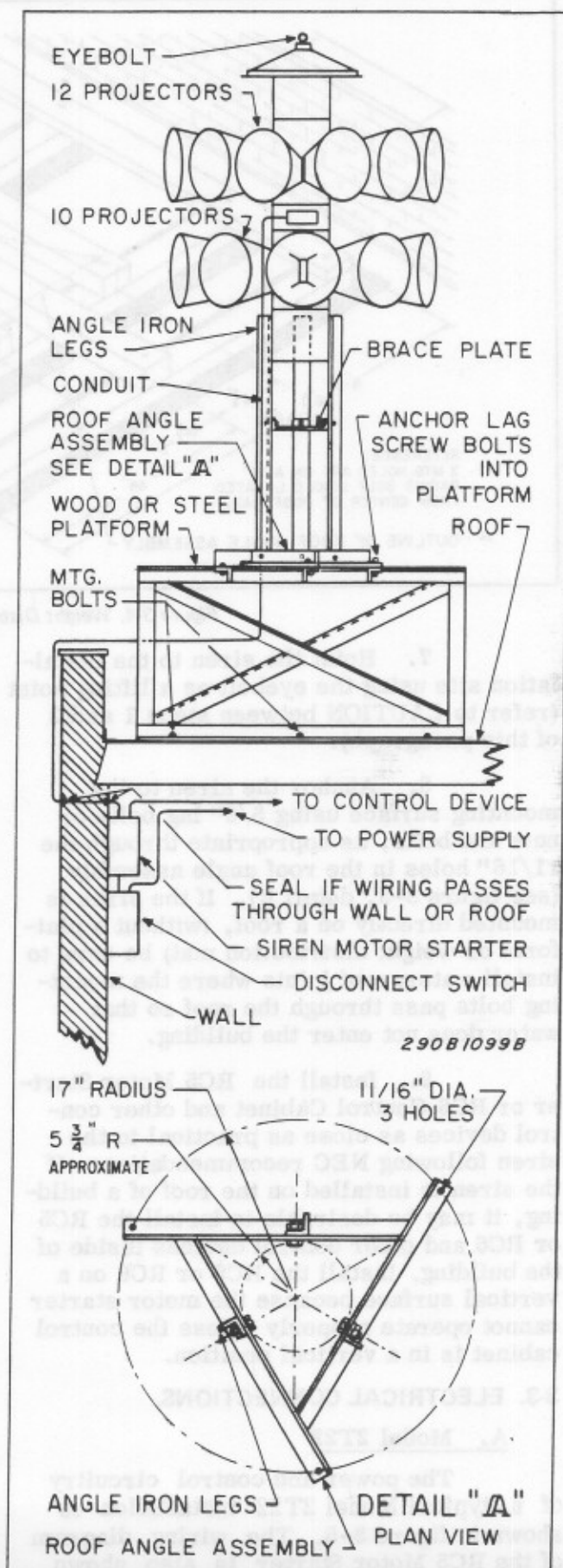


Figure 3-3. Flat Surface Mount with Platform.

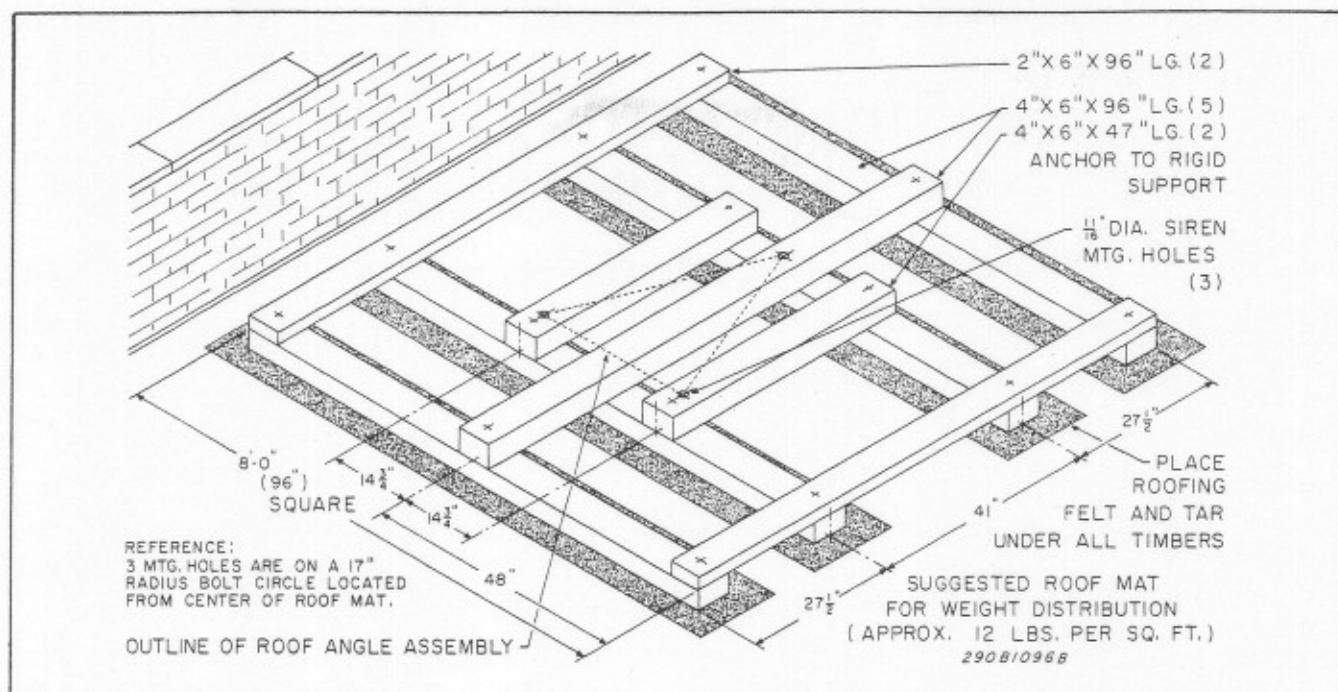


Figure 3-4. Weight Distribution Mat Construction.

7. Hoist the siren to the installation site using the eyebolt as a lifting point (refer to CAUTION between steps 1 and 2 of this paragraph).

8. Anchor the siren to the mounting surface using 5/8" lag bolts or nuts and bolts, as appropriate through the 11/16" holes in the roof angle assembly (see figure 3-3, detail A). If the siren is mounted directly on a roof, (without a platform or weight distribution mat) be sure to install waterproof joints where the mounting bolts pass through the roof so that water does not enter the building.

9. Install the RC5 Motor Starter or RC6 Control Cabinet and other control devices as close as practical to the siren following NEC recommendations. If the siren is installed on the roof of a building, it may be desirable to install the RC5 or RC6 and other control devices inside of the building. Install the RC5 or RC6 on a vertical surface because the motor starter cannot operate properly unless the control cabinet is in a vertical position.

### 3-3. ELECTRICAL CONNECTIONS.

#### A. Model 2T22

The power and control circuitry of a typical Model 2T22 installation is shown in figure 3-5. The wiring diagram of the RC5 Motor Starter is also shown in the figure.

The RC5 Motor Starter is provided with various size knockout holes. Some of the knockouts can accept 1/2" conduit fittings, others can accept 3/4" conduit fittings, and still others can accommodate 1" conduit fittings. These various sized knockout holes are provided because electrical wiring requirements are frequently unpredictable. The diameter of the conduit required for the installation depends on the number of wires that must pass through the conduit (at least 5 wires for 3 phase, two wires for single phase) the AWG size of the wiring used (see Table 3-1), the type of insulation on the wiring and local electrical codes. Therefore, be sure that the size of the conduit selected meets the requirements of the installation. The RC5W has a weatherproof housing that is not provided with knockout holes. Therefore the installer must drill or punch holes of the appropriate size to accommodate conduit fittings.

To connect the motor starter and siren to the power source and control circuitry, proceed as follows (see figure 3-5):

1. Install conduit between the RC5 and the electrical junction box on the side of the siren motor.

2. Install conduit between the RC5 and the disconnect switch.



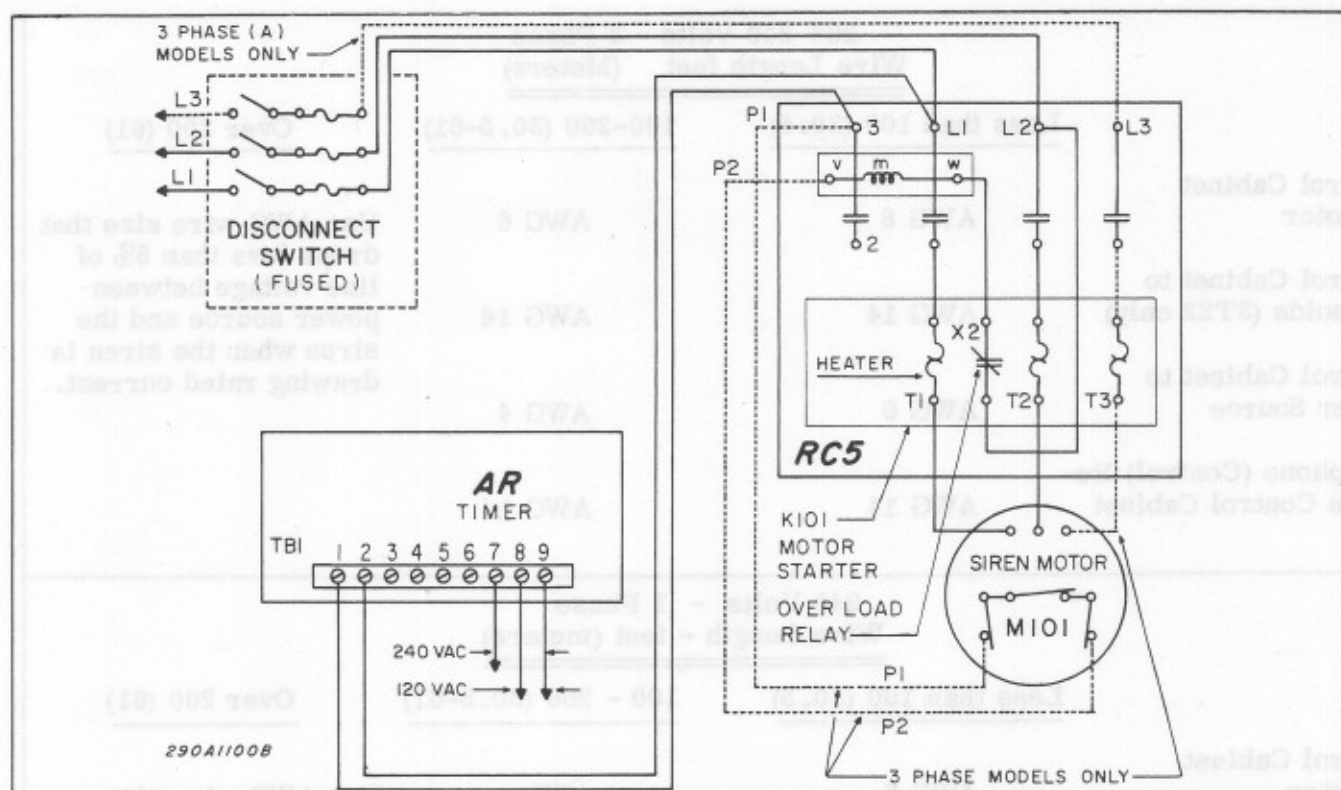


Figure 3-5. Model 2T22 Electrical Connections.

3. Install conduit between the disconnect switch and the electrical power source. If the siren is installed on a utility pole, add an entrance cap to the end of the conduit, as shown in figure 3-1.

4. Route three wires (2 wires for single phase-B-models) of the proper size from T1, T2, and T3 (3 phase-A-models only) to the motor leads in the junction box on the siren motor. See Table 3-1 for the proper wire size.

5. Three phase (A) models only. Route two AWG 12 insulated wires from terminals V and 3 on the motor starter to P1 and P2 in the siren motor junction box. Disconnect the jumper wire between terminals V and 3.

6. Route three wires (two wires for single phase-B-models) of the proper size from L1, L2 and L3 (3 phase-A-models only) through the conduit to the power disconnect switch. Refer to Table 3-1 for the proper wire size.

7. Route three wires (two wires for single phase-B-models) of the proper size from the disconnect switch to the power source. Refer to Table 3-1 for the proper wire size.

8. Connect terminals 1 and 2 of the AR Timer to terminals L1 and L3 in the motor starter. If it is desired to operate

the timer from remote control pushbuttons, install them at this time also. If the length of the wiring between the pushbuttons and the timer or the timer and the motor starter exceeds 2,000 feet (610m) install an SPST telephone relay, such as a Federal Model TRC\*1020, between each pushbutton and the timer or the timer and the motor starter. If it is required to cancel a signal from a remote location, remove the jumper between TB2-15 and TB2-16 and connect the normally closed contacts of the switch relay to TB2-15 and 16 (see figures 5-7 and 5-8). If it is necessary to install one or more telephone relays, a 48Vdc power supply, such as the Federal Model PS Power Supply, must be installed also. The power supply is necessary because the timer does not supply the 48Vdc necessary for the operation of the telephone relay(s). The telephone relays and power supply are NOT required when the length of the control lines is less than 2,000 feet. It is recommended that all control wiring be routed through conduit whenever practical.

#### B. Model 3T22

The power and control circuitry of a typical Model 3T22 installation is shown in figure 3-7. The schematic diagram of the Model RC6 Control Cabinet is shown in figure 5-6.



208-240 Volts - 3 Phase Wire Length feet (Meters)			
	<u>Less than 100 (30.5)</u>	<u>100-200 (30.5-61)</u>	<u>Over 200 (61)</u>
Control Cabinet to Motor	AWG 8	AWG 6	Use AWG wire size that drops less than 5% of line voltage between power source and the siren when the siren is drawing rated current.
Control Cabinet to Solenoids (3T22 only)	AWG 14	AWG 14	
Control Cabinet to Power Source	AWG 6	AWG 4	
Telephone (Control) Relay to Control Cabinet	AWG 14	AWG 14	

240 Volts - 1 Phase Wire Length - feet (meters)			
	<u>Less than 100 (30.5)</u>	<u>100 - 200 (30.5-61)</u>	<u>Over 200 (61)</u>
Control Cabinet to Motor	AWG 6	AWG 4	Use AWG wire size that drops less than 5% of line voltage between power source and the siren when the siren is drawing rated current.
Control Cabinet to Solenoids (3T22 only)	AWG 14	AWG 14	
Control Cabinet to Power Source	AWG 4	AWG 2	
Telephone (Control) Relay to Control Cabinet	AWG 14	AWG 14	

480 Volts - 3 phase Wire Length - feet (meters)			
	<u>Less than 100 (30.5)</u>	<u>100-200 (30.5-61)</u>	<u>Over 200 (61)</u>
Control Cabinet to Motor	AWG 12	AWG 10	Use AWG wire size that drops less than 5% of line voltage between power source and the siren when the siren is drawing rated current.
Control Cabinet to Solenoids (3T22 only)	AWG 14	AWG 14	
Power Source to Control Cabinet	AWG 10	AWG 8	
Telephone (Control) Relay to Control Cabinet	AWG 14	AWG 14	

Table 3-1. Wire Sizes.

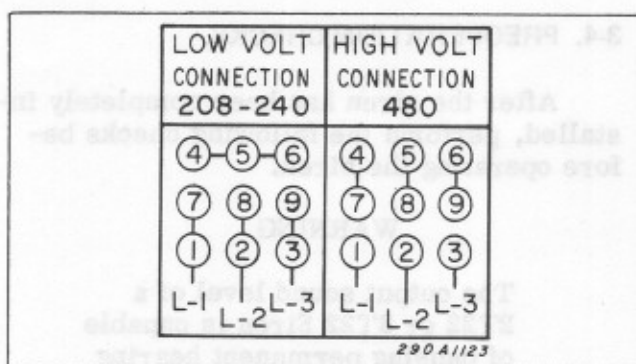


Figure 3-6. Three Phase Motor Power Connections.

The Model RC6 Control Cabinet is not provided with conduit fitting knockouts. However the use of electrical conduit is usually required by local electrical codes. This makes it necessary to drill or punch holes of the appropriate size in the cabinet to accommodate conduit fittings. The diameter of the conduit and fittings required in a given installation depends on the number of wires that must pass through the conduit (at least five wires for 3 phase, at least two wires for single phase), the AWG wire size of the wiring (see table 3-1), the type of insulation on the wiring, and local electrical codes. Therefore, be sure that the size of the conduit selected meets the requirements of the installation.

To connect the control cabinet and siren to the power source and control circuitry, proceed as follows (see figure 3-7).

1. Install conduit between the RC6 and the junction box on the side of the siren motor.
2. Install conduit between the RC6 and the bottom solenoid housing.
3. Install conduit between the RC6 and the disconnect switch.
4. Install conduit between the disconnect switch and the power source. If the siren is installed on a utility pole, add an entrance cap to the end of the conduit.

#### NOTE

All terminal blocks (TB101, TB102, etc.) are located in the RC6.

5. Route three wires (2 wires for single phase B models) of the proper size between TB103-T1, T2, and T3 (3 phase

models only) to the motor leads in the junction box on the side of the siren motor. Refer to Table 3-1 for the proper wire sizes.

6. (Three phase -A-models only) The three phase motor can be operated from either a 208-240 Vac or a 480 Vac source when the appropriate arrangement of electrical connections is used. The siren is shipped with the motor wired to operate at the voltage specified by the customer. This voltage is stamped on the nameplate of the motor. However, if it is ever necessary to change the motor operating voltage, connect the wires in the appropriate arrangement, as shown in figure 3-6. NOTE: If it is ever necessary to change the siren operating voltage, the controls must also be modified or exchanged.

#### NOTE

Perform step 7 only if a high-low "Fire" signal is desired, step 8 only if a pulsed "Fire" signal is desired.

7. If a high-low "Fire" signal is desired, route three wires of the proper size, through the conduit that was installed in step 2. Refer to Table 3-1 for the proper wire size. Connect one of the wires from TB105-C to wire "C" in the bottom solenoid housing. Connect a second wire from TB105-1 to wire "1" in the solenoid housing, and connect the third wire from TB105-2 to wire "2" in the housing.

8. If a pulsed "Fire" signal is desired, route two wires of the proper size through the conduit that was installed in step 2. Refer to Table 3-1 for the proper wire size. Connect one of the wires from TB105-C to wire "C" in the solenoid housing. Connect wires "1" and "2" and connect them to TB105-1.

9. Three phase (A) models only. Route two AWG 12 insulated wires from P1 and P2 on TB104 to P1 and P2 in the junction box on the side of the siren motor.

10. Route three wires (two wires for single phase-B-models) of the proper size from TB101-L1, L2 and L3 (3 phase-A-models only) through the conduit to the power disconnect switch. Refer to Table 3-1 for the proper wire size.

11. Route three wires (two wires for single phase-B-models) of the proper size from the disconnect switch to the power source. Refer to Table 3-1 for the proper wire size.

12. Install the AF Timer (see figure 3-7) 3-7). If it is desired to operate the timer from remote pushbuttons, install them at this time also. If the length of the wiring between the pushbuttons and the timer or the timer and the control cabinet exceeds 2,000 feet (610m) install an SPST telephone relay, such as the Federal Model TRC\*1020. If it is necessary to install one or more telephone relays, a 48Vdc power supply, such as the Federal Model PS Power Supply must be installed. This is necessary because the timer does not supply the 48Vdc required for the operation of the relay(s). The telephone relay(s) and power supply are NOT necessary when the length of the control lines is less than 2,000 feet (610m). It is recommended that all control wiring be routed through conduit.

### 3-4. PREOPERATION CHECKS.

After the siren has been completely installed, perform the following checks before operating the siren.

#### WARNING

The output sound level of a 2T22 or 3T22 Siren is capable of causing permanent hearing damage at short distances. Therefore, ALWAYS wear hearing protection when performing tests or maintenance on the siren.

#### A. Model 2T22.

1. Make sure that the intake tubes and horns are not obstructed.
2. Press the TEST pushbutton on the AR Timer. The siren should produce a continuous, dual-tone signal until the pushbutton is released.

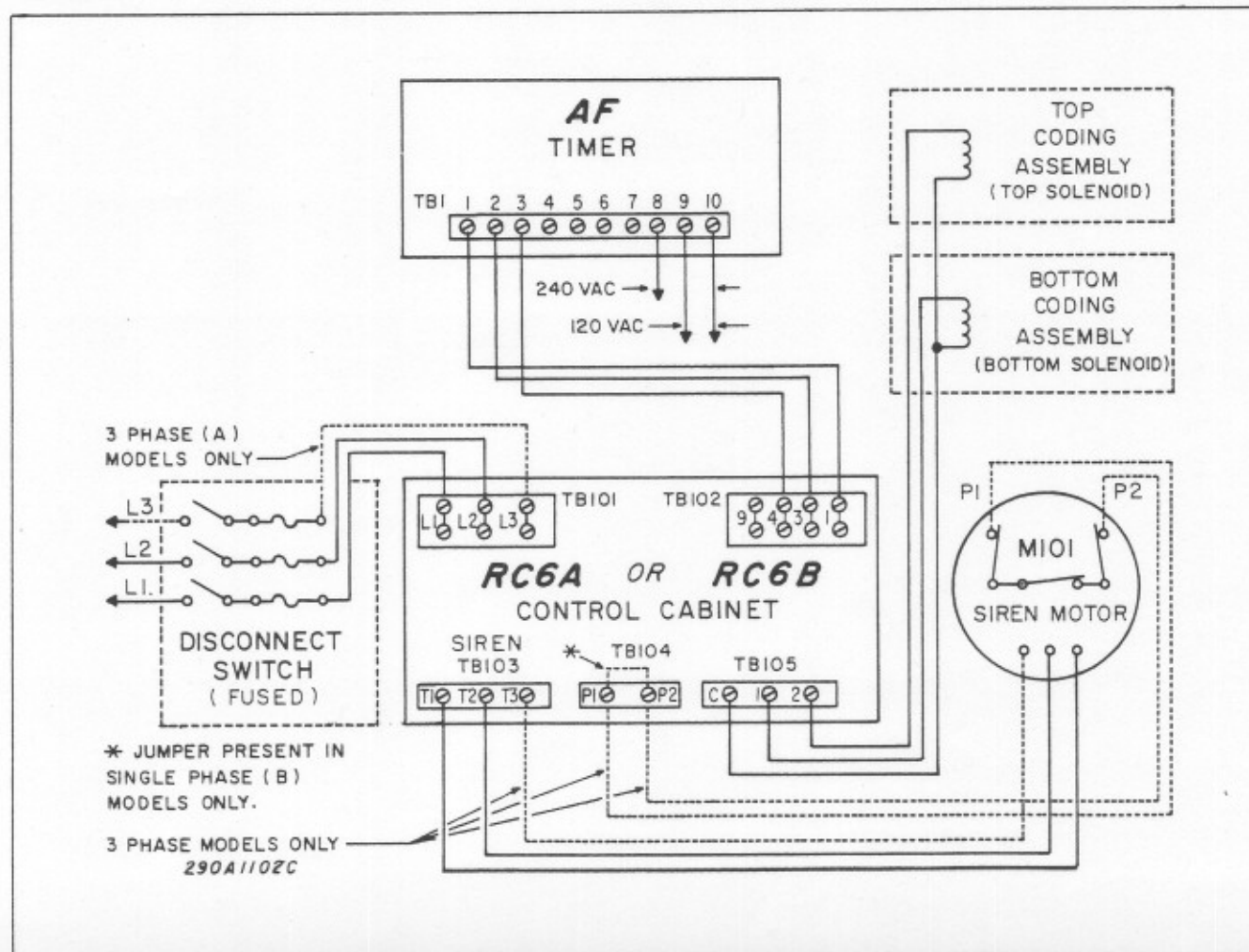


Figure 3-7. Model 3T22 Electrical Connections.



3. Check the operation of the control circuitry by initiating one or more signals from the AR Timer.

After the installation is complete and it has been established that the siren is operating properly, Federal recommends that all control devices be padlocked to discourage tampering and vandalism.

#### B. Model 3T22.

1. Make sure that the intake tubes and horns are not obstructed.

2. Make sure that the damper plates, in the intake tubes, are unobstructed and move freely.

3. Set both the SIREN and WARBLE switches to the AUTO position. Apply power to the control cabinet.

4. Set the SIREN switch to the TEST position. The siren should produce a continuous dual tone signal.

5. Set the WARBLE switch to the TEST position while the siren is sounding. The siren should produce an alternating high-low signal. Return both switches to the AUTO position. The siren is ready for operation when both switches are set to AUTO.

6. Check the operation of the control circuitry by initiating one or more signals from the AF Timer.

After the installation is complete and it has been established that the siren is operating properly, Federal recommends that all control devices be padlocked to discourage tampering and vandalism.

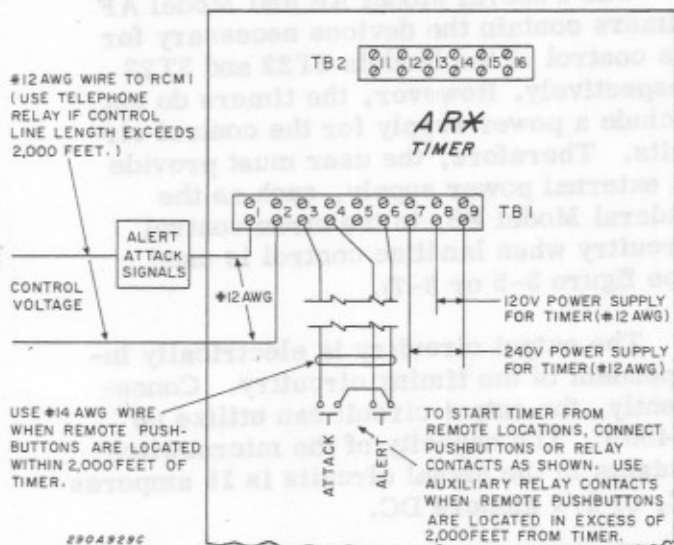


Figure 3-8. AR Timer Electrical Connections.

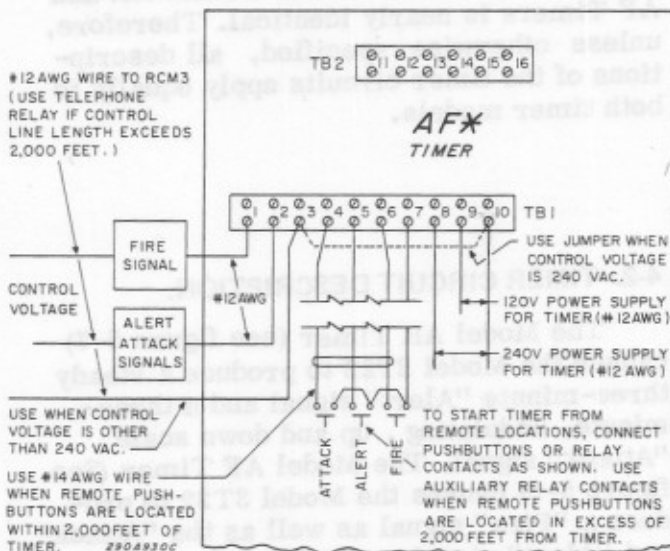


Figure 3-9. AF Timer Electrical Connections.



## SECTION IV

### CIRCUIT DESCRIPTION

#### 4-1. GENERAL.

Most 2T22 and 3T22 installations include a Model AF or Model AR Timer. The Model AR Timer may be installed with a Model 2T22. In order to utilize the full capability of a Model 3T22, a Model AF Timer is required. A Model AF Timer may also be used to control a 2T22 siren.

The Models RC5 and RC6 Control Cabinets contain the motor starter necessary for the 2T22 and 3T22, respectively. The RC6 also controls the solenoid-operated coding mechanisms in the Model 3T22.

The operation of the Models AR and AF Timers is nearly identical. Therefore, unless otherwise specified, all descriptions of the timer circuits apply equally to both timer models.

#### 4-2. TIMER CIRCUIT DESCRIPTION.

The Model AR Timer (see figure 5-7) causes the Model 2T22 to produce a steady three-minute "Alert" signal and a three-minute, undulating, up and down scale "Attack" signal. The Model AF Timer (See figure 5-8) causes the Model 3T22 to produce a "Fire" signal as well as the "Attack" and "Alert" signals. The "Fire" signal is a two-minute, undulating, rapidly alternating high and low pitched signal, up scale, and a continuous, dual-tone signal down scale.

The timers control undulating signals ("Attack" and "Fire") by applying a series of eight second control contact closures separated by four second opens to the control winding (coil) of the motor starter.

Both timer models include a TEST pushbutton (S4 in the AR, S5 in the AF). The TEST pushbutton operates the control devices and the siren only for the time that it is pressed. The timer is not activated because the TEST pushbutton is in the timer output circuit.

The CANCEL button (S3 in the AR, S4 in the AF) enables the siren operator to stop the siren in the event an error was made in the selection of a signal. If a signal is cancelled, the timer motor continues through the 3-minute cycle. If another signal is selected during the cycle, it will be produced only for the remainder of the signal cycle selected.

The AR and AF Timers may be operated from either a 120 volt or 240 volt, 50-60Hz source. When properly connected to the power source, transformer T1 provides 120 volts to the 120 volt components.

The Federal Model AR and Model AF Timers contain the devices necessary for the control of the Models 2T22 and 3T22 respectively. However, the timers do not include a power supply for the control circuits. Therefore, the user must provide an external power supply, such as the Federal Model PS, in the siren control circuitry when landline control is used (see figure 3-5 or 3-7).

The output circuitry is electrically independent of the timing circuitry. Consequently, the output circuit can utilize up to 480V. The capacity of the microswitch contacts in the signal circuits is 15 amperes AC, or 1/4 ampere DC.

The timer is activated by pressing the appropriate local or remote pushbutton for at least two seconds.

The red pilot light, DS2, on the front panel of the timer, indicates that the timer is cycling. The yellow pilot light, DS1, indicates that power is available to the timer.

When the ALERT, ATTACK or FIRE (Model AF Timer only) pushbutton is pressed, the respective relay energizes, establishing a holding circuit through the relay holding contacts. Simultaneously, the motor feed contacts apply operating voltage to the timer motor, M, and the motor begins to rotate the cams. After the cams rotate slightly, the motor feed cam contacts close to provide a parallel circuit to the timer motor.

The control closures that produce the "Attack" and "Fire" signals are generated by cam-operated timer contacts and applied to the siren motor starter coil or control panel terminals (TB102) through the signal contacts of the selected timer relay. There are no cam-operated contacts for the "Alert" signal. Thus when selected, a sustained closure is applied to the siren motor coil and control panel, and the siren produces a signal having constant level and pitch for 3 minutes. Several seconds before the end of the 3-minute cycle, the cam-operated hold contacts open momentarily, releasing the relay holding circuit. The timer control circuit closure to the motor starter coil or control cabinet opens, stopping the siren motor.

The "Attack" signal has priority over all other signals. If "Attack" is initiated during "Alert" or "Fire", "Attack" automatically overrides them until the timer cycle ends, or the CANCEL button is pressed. Similarly, "Alert" has priority over "Fire". The CANCEL button can override a higher priority signal. Thus, to override "Attack" with "Alert", press the CANCEL pushbutton, then press the ALERT pushbutton.

The Models AR5 and AF5 are similar to the Standard AR and AF Models, except that the AR5 and AF5 have a 5-minute timing cycle.

#### 4-3. SIREN CONTROL DESCRIPTION.

##### A. Model RC5 (See figure 3-5).

Application of a control signal to the RC5 energizes the motor starter and applies power to the siren motor, causing the siren to sound. The 2T22 produces the undulating "Attack" signal because the timer closes the control circuit for eight seconds and opens the circuit for four seconds. When the control circuit opens, the motor starter deenergizes, deenergizing the siren motor. As the siren motor coasts toward a stop, the pitch of the sound from the siren decreases. After approximately four seconds, the timer energizes the motor starter and the motor starter reapplies power to the motor, the pitch of the signal increases, and the cycle repeats.

The timer causes the siren to produce the continuous "Alert" signal by energizing the motor starter continuously for three minutes. As a result, the siren is energized continuously for three minutes causing the siren to produce a continuous tone signal.

As shown in figure 3-5, the motor starter includes an overload relay. The relay protects the motor starter and the motor in the event that excess current is drawn. The overload relay is activated when there is sufficient current through one or more of its heaters to cause the heater(s) to expand enough to open the relay contacts. The opening of the relay contacts opens the motor starter control circuit. As a result the motor starter deenergizes, protecting the circuit against damage. After the motor starter deenergizes, the relay contacts reset automatically when the heater(s) cools sufficiently. The overload relay can also be reset manually after approximately one minute.

##### B. Model RC6 (See figure 5-6).

When a control signal is applied to the RC6, the motor starter energizes and applies power to the siren motor causing the siren to sound. The 3T22 produces the undulating "Attack" and some "Fire" signals (see figure 1-2) because the timer periodically opens the control circuit. When the timer opens the control circuit, the motor starter deenergizes, deenergizing the siren motor. As the siren motor coasts toward a stop, the pitch and intensity of the siren signal decreases. After approximately four seconds, the timer reapplies power to the motor starter and the motor, the signal pitch increases as the motor speed increases, and the cycle repeats.

The siren produces the continuous "Alert" signal and some "Fire" signals (see figure 1-2) because the timer continuously energizes the motor starter for three minutes. As a result, the siren motor operates continuously for three minutes, producing a continuous tone signal.

As shown in figure 5-6, the motor starter includes an overload relay. The relay protects the motor starter and the motor in the event that the motor draws excess current. The overload relay is activated when there is sufficient current

through one or more of its heaters to cause the heater(s) to expand enough to open the relay contacts. The opening of the relay contacts opens the control circuit of the motor starter. As a result, the motor starter deenergizes, protecting the circuit against damage. After the motor starter deenergizes, the relay contacts reset automatically after the heater(s) cools sufficiently. The overload relay can be reset manually after approximately one minute.

The Model RC6 Control Cabinet also includes an Alternating Timer, M301 and two associated microswitches, SW303 and SW304. The Alternating Timer enables the RC6 to control the 3T22 coding mechanisms that produce the alternating high-low signal frequently used as a "Fire" signal. The alternating timer is an eddy current motor that actuates cam-operated microswitches, SW303 and SW304. These two microswitches control the operating power to the solenoids in the 3T22 coding mechanisms. The cams on the motor drive shaft are arranged so that when one of the cams opens the contacts of its associated microswitch the other closes the contacts of its switch, and vice versa. Consequently, as M301 rotates, it alternately opens and closes SW303 and SW304. As a result, the solenoid-operated damper plates in the coding mechanisms, alternately open and close the upper and lower intake tubes of the siren. This causes the siren to produce an alternating high-low tone as the siren motor operates. Relay K102 controls operating power to the Alternating Timer.

#### 4-4. THERMAL PROTECTION CIRCUIT. (3 Phase Models Only).

Three phase (A) motors are designed to operate for a maximum of 15 minutes with at least 45 minutes between 15 minute operations. If the siren is operated for more than 15 minutes, or the 45 minute off-time is not observed, the motor may overheat and be damaged. As a result, three thermal protectors are included in the motor; one for each field winding. As shown in figures 3-5 and 3-7, these three thermal protectors are electrically in series with the control winding (coil) of the motor starter in the RC5 or RC6. If one or more of the field windings overheat, the associated thermal protector opens the circuit, deenergizing the motor starter coil and turning off power to the motor. After the motor cools off sufficiently, the protector(s) closes and the siren can be re-energized.

The thermal protection circuit is a secondary protection circuit that is not absolutely necessary for the operation of the siren. In addition, the three thermal protectors are an integral part of the motor. A faulty thermal protector CANNOT be replaced without replacing the entire motor. Therefore, if a thermal protector malfunctions (opens), connect a jumper wire between TB104-P1 and P2 in the control cabinet.



## SECTION V

# SERVICE AND MAINTENANCE

### 5-1. GENERAL.

The Models 2T22 and 3T22 Sirens are designed to require a minimum of maintenance. Experience has indicated that the 2T22 and 3T22 are highly reliable sirens. However, if a siren failure does occur, Federal will provide technical assistance with problems that cannot be handled locally. If assistance is desired, contact:

Service Department  
Federal Signal Corporation  
2645 Federal Signal Drive  
Park Forest South, IL 60466

It is recommended that the siren be tested for proper operation at least once a month. However, a daily test of the siren at noon, curfew, or other selected time, provides a more reliable test of system readiness. In addition, the daily test enhances the usefulness of the siren and instills public confidence in the reliability of the warning system.

### 5-2. ANNUAL INSPECTION.

In order to minimize the possibility of siren failure, inspection and maintenance at regular intervals is desirable. Therefore it is recommended that the procedure in this paragraph be performed at least once a year. However, it may be necessary to increase the frequency of this procedure if the siren is used frequently or if it is used in an extreme climate. ALWAYS turn off the power to the siren at the disconnect switch before inspecting the siren.

1. Model 3T22 only. Inspect the spring in each coding mechanism assembly. Replace the spring if it is worn, sprung, stretched, or broken.

Perform steps 2 through 4 on single phase (B) models only.

2. Remove the inspection cover and inspect the motor brushes. Replace the brushes if they are 7/8 inch long or less. Refer to paragraph 5-3B for brush replacement instructions.

3. Examine the motor commutator for burned spots, pitting and signs of excessive wear. If necessary, remove the motor brushes and use a fine grade of sandpaper to clean the commutator. DO NOT use aluminum oxide paper or emery cloth to clean the commutator.

4. After cleaning the commutator, use a small screwdriver or similar tool to clean the slots between the commutator segments. Use caution to avoid damaging the commutator surface.

5. Inspect all screens on the siren. There is one screen in each intake tube and one screen at the throat of each projector. Replace all damaged screens.

6. Inspect all electrical and mechanical connections. Make sure that all fasteners are properly tightened.

7. Inspect the siren installation to be sure that it is vertically oriented. Take corrective action if a pole mounted installation is more than 5° from vertical or a roof or flat surface mount is more than 10° from vertical to prevent lubrication losses and excessive motor bearing wear.

8. Examine all painted surfaces. Repaint as necessary.

### 5-3. CORRECTIVE MAINTENANCE.

#### A. Troubleshooting.

The Troubleshooting Chart (Chart 5-1) is provided to assist repair personnel when troubleshooting a siren malfunction. This section also includes diagrams that may be helpful if the siren or control devices need repair.

#### WARNING

Always turn off the power at the disconnect switch before performing any maintenance on the siren.

#### B. Motor Brush Replacement (Single Phase (B) models only)

1. Turn off the power to the siren at the disconnect switch.

2. Remove the inspection cover, from the motor.

3. See figure 5-1 while performing steps 3 through 10 of this procedure. Remove the pigtail screw from the brush holder, and lift the pigtail leads away from the holder.



Chart 5-1. Troubleshooting Chart

TROUBLE	POSSIBLE CAUSE	REMEDY
Siren motor inoperative.	Motor starter overload relay tripped.	Reset relay
	Open circuit between Control Cabinet and Motor.	Check wiring for continuity.
	Rotor(s) jammed.	Check rotor(s), for free rotation. Remove material causing jamming.
	Siren motor defective.	Check motor, and repair or replace, if necessary.
	Open thermal protector in motor.	Connect a jumper wire between TB104-P1 and P2.
Coding Mechanism(s) inoperative (Model 3T22 only).	Open connection between solenoid(s) and control cabinet.	Check wiring for continuity.
	Defective solenoid.	Check solenoid, repair or replace, if necessary.
	Jammed damper plate.	Check for obstructions. Remove material causing obstruction.
	Broken spring or crank loose on connecting rod.	Replace spring (refer to paragraph 5-3C) or tighten fasteners, as appropriate.
	Alternating Timer, M301, or K102, in RC6, malfunctioning.	Check M301 and K102. Repair or replace if necessary.

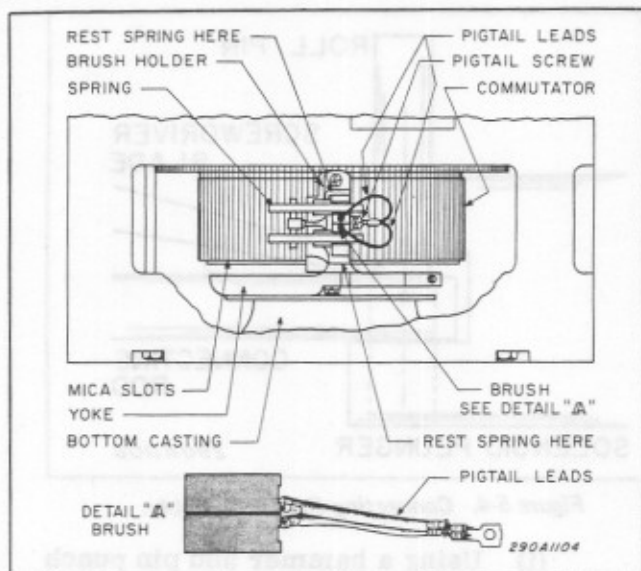


Figure 5-1. Single Phase Motor Brush Replacement.

4. Carefully lift the springs away from the two-segment brush and allow each spring to rest on the brush holder next to the brushes, as indicated in figure 5-1.

5. Lift the worn brushes out of the brush holder. When replacing brushes, they must be contoured to the commutator. If the brushes are not contoured, the commutator may be damaged and the brushes may wear excessively. To contour the replacement brushes, proceed as follows:

6. Cut a strip of 000 sandpaper  $1\frac{1}{2}$ " wide by  $13\frac{1}{4}$ " long (38mm x 336mm). Do NOT use aluminum oxide paper or emery cloth.

7. Insert one end of the sandpaper in one of the slots between the commutator segments and wrap the paper around the commutator.

8. Install the replacement brushes in the brush holder making sure that the pigtail leads are next to each other as shown in detail "A" of figure 5-1.

9. Carefully place the springs in the notches in the brush.

#### WARNING

The rotors lend a significant amount of inertia to the siren motor armature. As a result, the rotor ports could cause severe injury when the rotors are rotating at any speed. Therefore, DO NOT rotate the commutator by sticking your fingers in the stator ports and pushing on any part of either rotor.

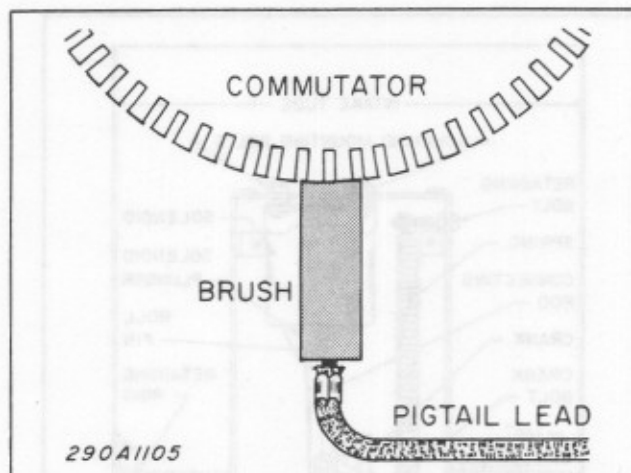


Figure 5-2. Replacement Brush Contouring.

10. Connect the pigtail leads to the brush holder, using the pigtail screw.

11. Manually rotate the motor armature approximately ten turns in the direction the sandpaper is wrapped.

12. Lift the brushes slightly and remove the sandpaper from the motor. Clean all carbon dust out of the commutator. The brush should seat on the commutator as shown in figure 5-2. If the brush does not fully contact the commutator, as shown in figure 5-2, repeat steps 7 through 12 until the brushes seat on the commutator as shown in the figure.

13. Manually rotate the siren motor by pushing on the commutator through the inspection port in the motor housing (see WARNING). Observe the operation of the brushes on the surface of the commutator. The brushes should slide smoothly on the commutator surface and should not shift position vertically or laterally. If the brushes do not slide smoothly or if they shift position, repeat steps 9 through 12.

#### C. Solenoid Replacement (Model 3T22 only).

#### NOTE

Whenever it is necessary to replace a coding mechanism solenoid, it is recommended that the spring in the mechanism be changed also.

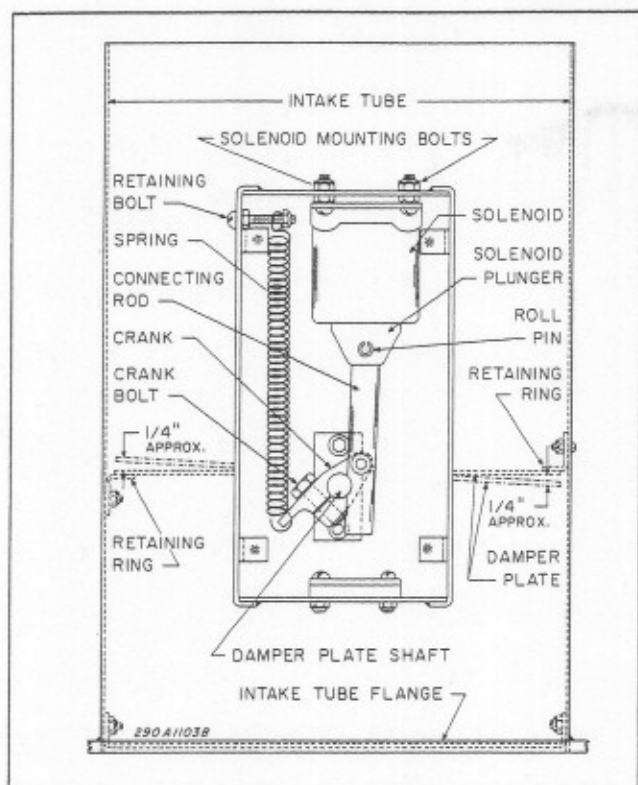


Figure 5-3. Upper Solenoid Replacement.

1. Upper Solenoid (See figure 5-3).

(a) Turn off the power to the siren at the disconnect switch.

(b) Unscrew the eyebolt from the top of the siren and lift off the sheet metal dome.

(c) Remove the cover from the coding mechanism.

(d) Remove the screen from the intake tube.

(e) Remove the two wire nuts from the electrical wiring inside the housing and disconnect the power leads from the solenoid.

(f) Remove the spring from the coding mechanism.

(g) Loosen the crank bolt until the crank rotates loosely on the damper plate shaft.

(h) Remove the four solenoid mounting bolts and lift the solenoid out of the housing while sliding the crank off of the damper plate shaft.

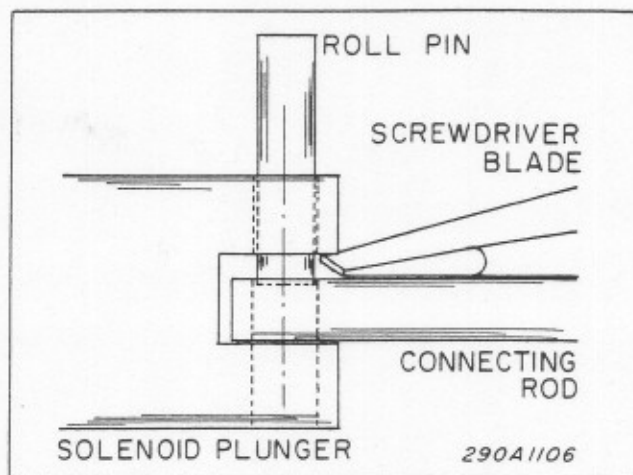


Figure 5-4. Connecting Rod Reassembly.

(i) Using a hammer and pin punch or similar tool, drive the roll pin out of the solenoid plunger, and pull the connecting rod out of the slot in the solenoid plunger.

(j) Insert the connecting rod into the slot in the replacement solenoid plunger. Align the holes in the plunger and connecting rod as closely as possible.

(k) Insert the roll pin into the hole in the replacement solenoid plunger. Gently tap the roll pin until it begins to engage the hole in the connecting rod. Continue to tap the roll pin until the connecting rod contacts the opposite side of the slot in the plunger, as shown in figure 5-4.

(l) Insert a large screwdriver or similar tool into the space between the connecting rod and the solenoid plunger slot to serve as a shim as shown in figure 5-4. The solenoid plunger laminations may separate as the roll pin is driven through the connecting rod if this temporary shim is not used.

(m) Drive the roll pin through the connecting rod and the other side of the plunger slot. Remove the shim.

(n) Install the replacement solenoid in the coding mechanism housing with the crank loosely in place on the shaft.

(o) Close the damper plate by hand and set a light weight object on the plate to hold it against the retaining rings in the tube.



(p) Firmly push the solenoid plunger up into the frame as far as it will go. Hold the plunger firmly against the solenoid frame.

(q) If necessary, adjust the lateral position of the loose crank on the shaft so that the plunger is at a right angle to the axis of the shaft. Tighten the crank bolt and release the solenoid plunger.

(r) Reinstall the spring between the crank and the retaining bolt. Attach the spring to the crank first, and then to the retaining bolt.

(s) Manually push the solenoid plunger into the frame as far as it will go. Hold the plunger firmly against the solenoid frame and inspect the position of the damper plate. There should be a gap of approximately  $1/4"$  between the plate and the retaining rings. If the gap is not  $1/4" \pm 1/16"$ , loosen the crank bolt, and repeat steps (o) through (s).

(t) Connect the solenoid electrical leads to the power leads in the housing.

(u) Reapply power to the control cabinet and set the WARBLE switch in the RC6, to the TEST position. Do NOT set the SIREN switch to the TEST position. Observe the operation of the solenoid. If the solenoid produces a loud "humming" or "rattling" sound or appears to be vibrating, the plunger is not seating properly. The plunger MUST seat properly to prevent the solenoid coil from overheating and burning out. Therefore, turn off the power to the siren, and repeat steps (o) through (s).

## 2. Lower Solenoid (See figure 5-5)

(a) Turn off the power to the siren at the disconnect switch.

(b) Remove the intake screen from the lower intake tube.

(c) Follow the procedure in steps (c) through (n) of paragraph 5-3C.1.

(d) Close the damper plate by hand and wedge the plate shut with a 3" length of wood or similar object. Install the wedge between the damper plate and one of the leg mounting nuts, as shown in figure 5-5.

(e) Follow the procedure in steps (p) through (u) in paragraph 5-3C.1.

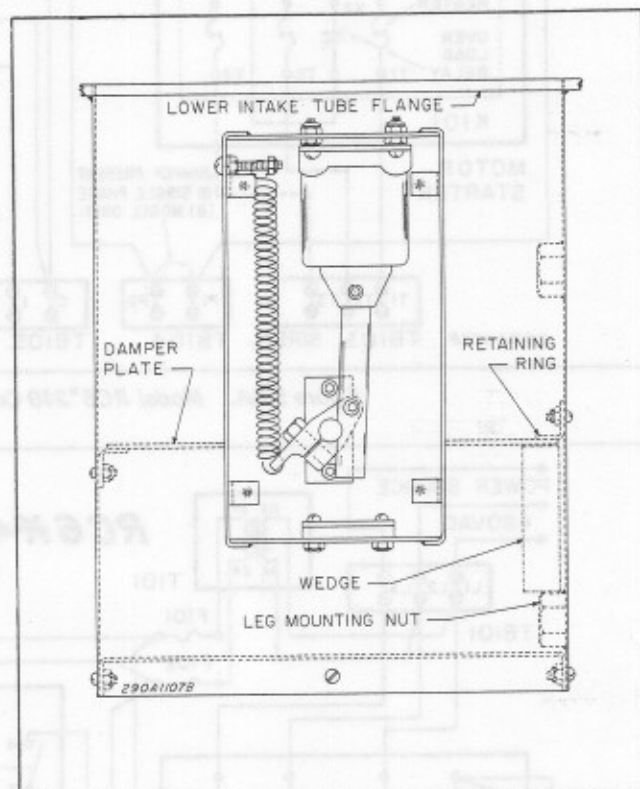


Figure 5-5. Lower Solenoid Replacement.



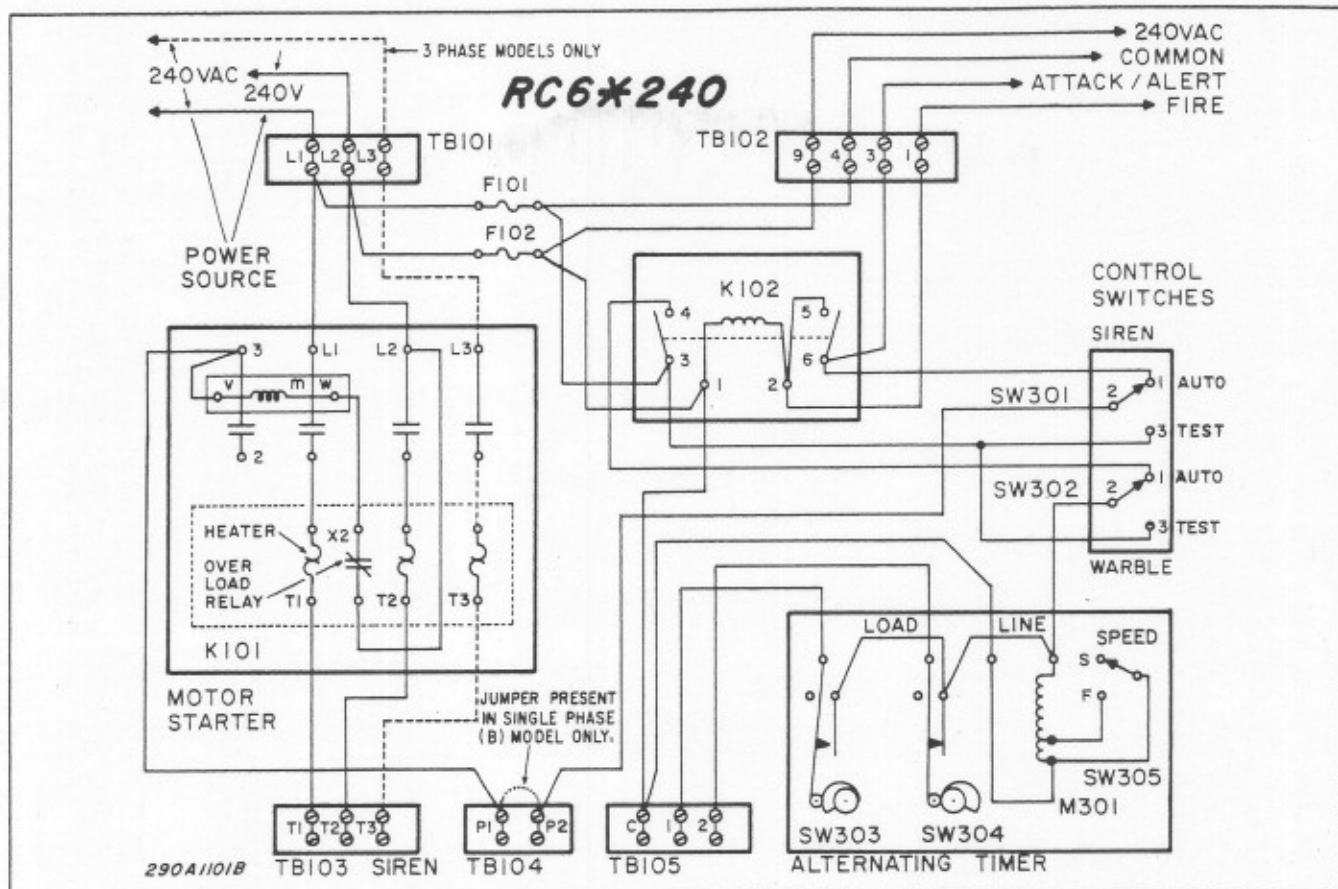


Figure 5-6A. Model RC6\*240 Control Cabinet Wiring Diagram.

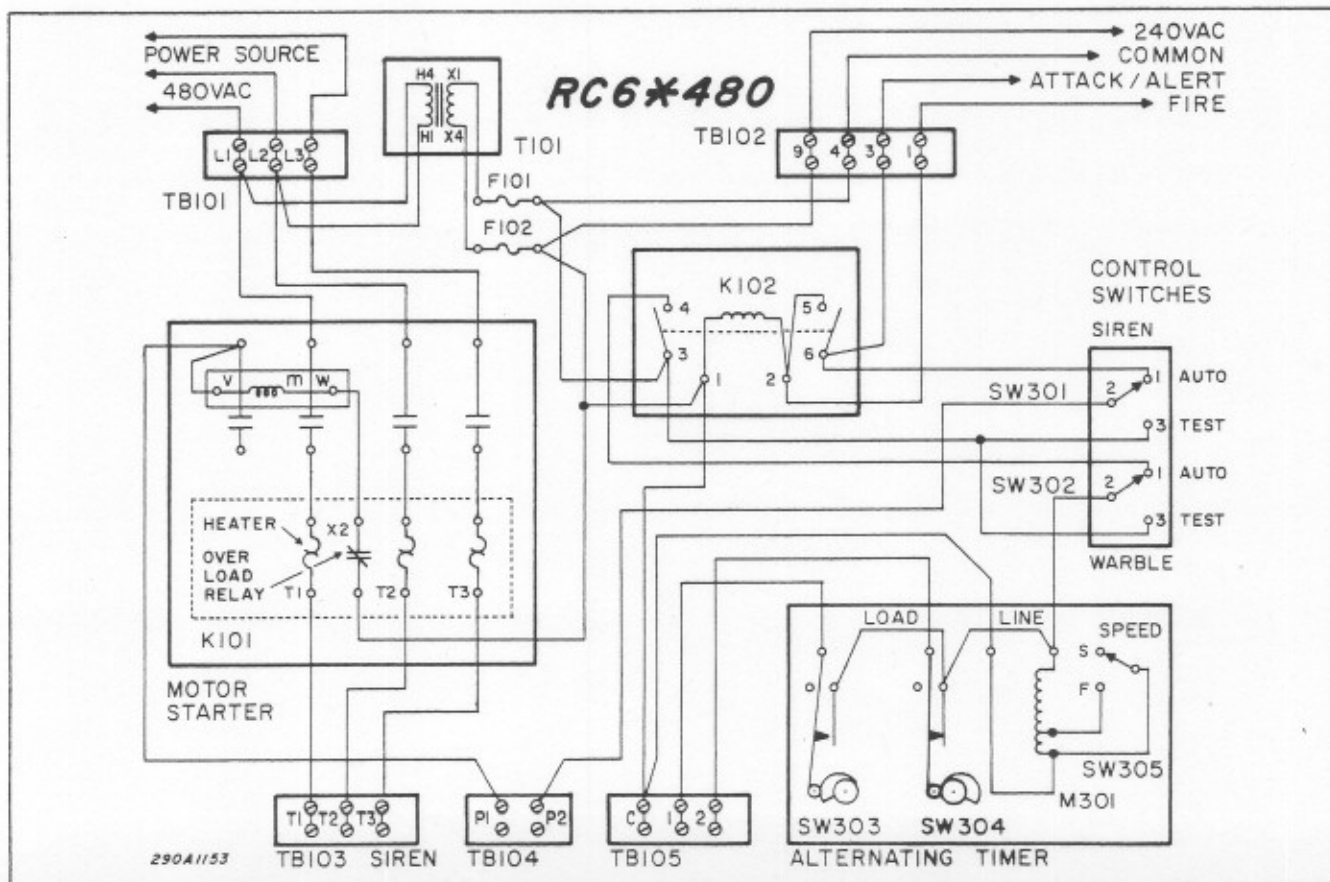


Figure 5-6B. Model RC6\*480 Control Cabinet Wiring Diagram.

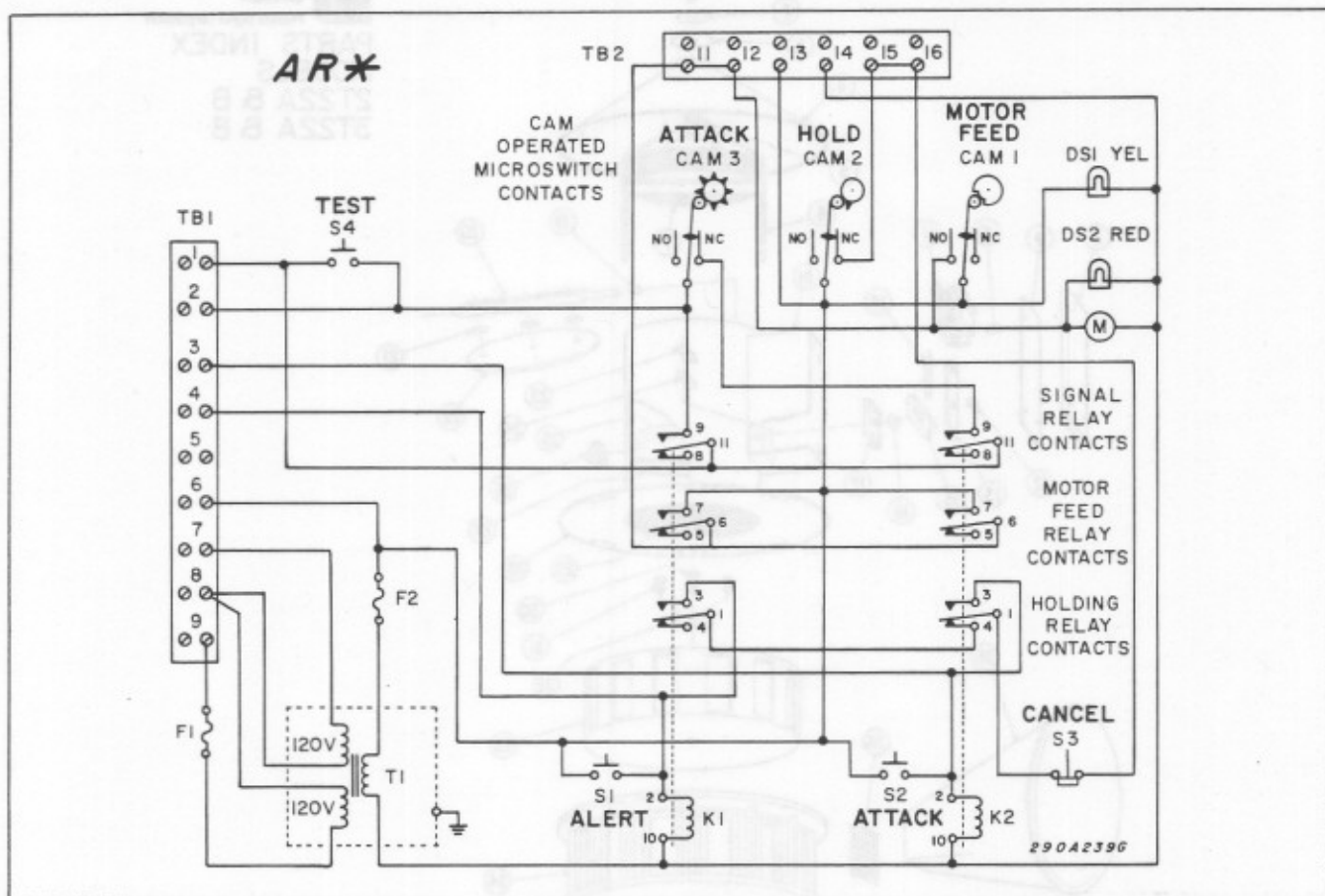


Figure 5-7. Model AR Timer Wiring Diagram.

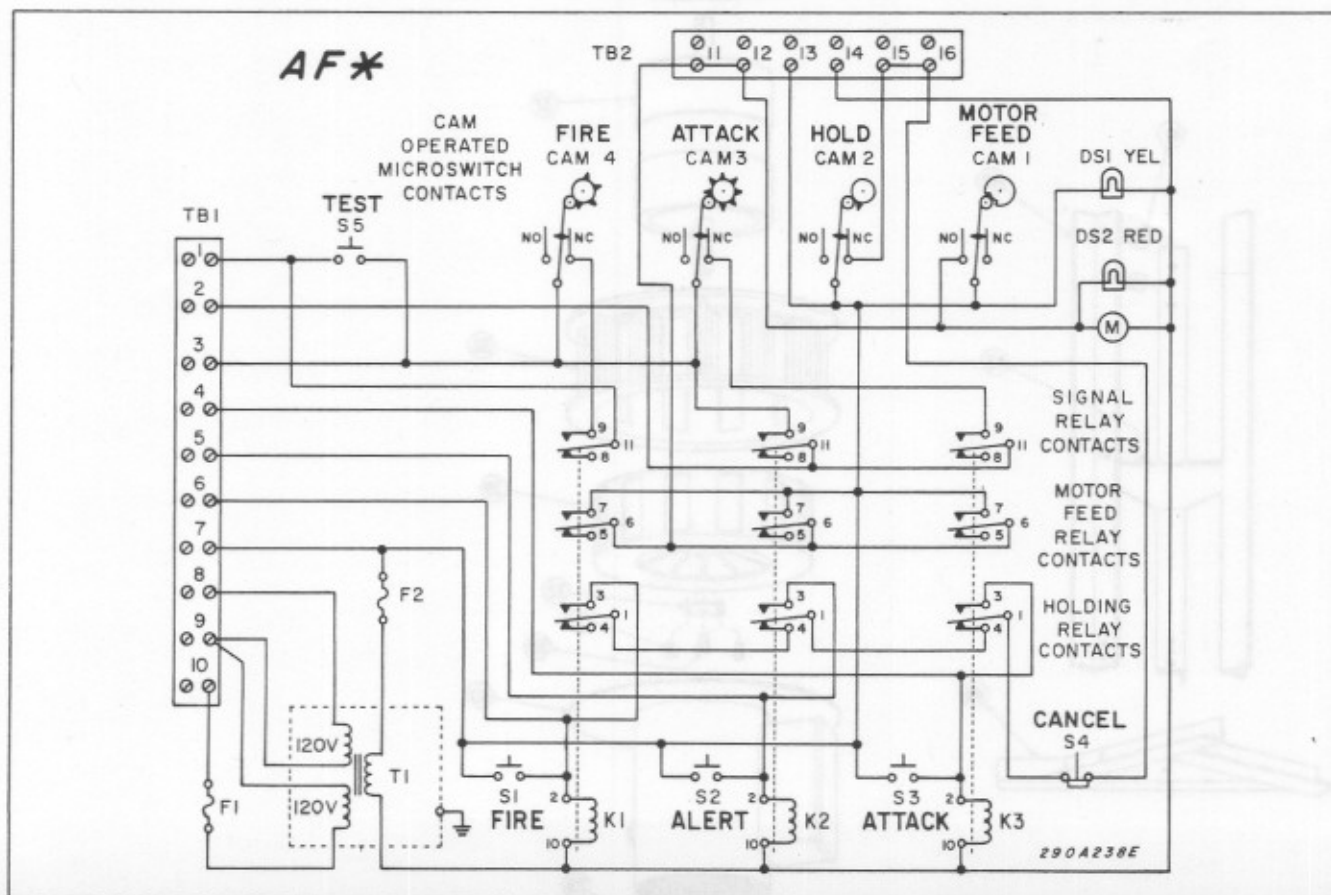
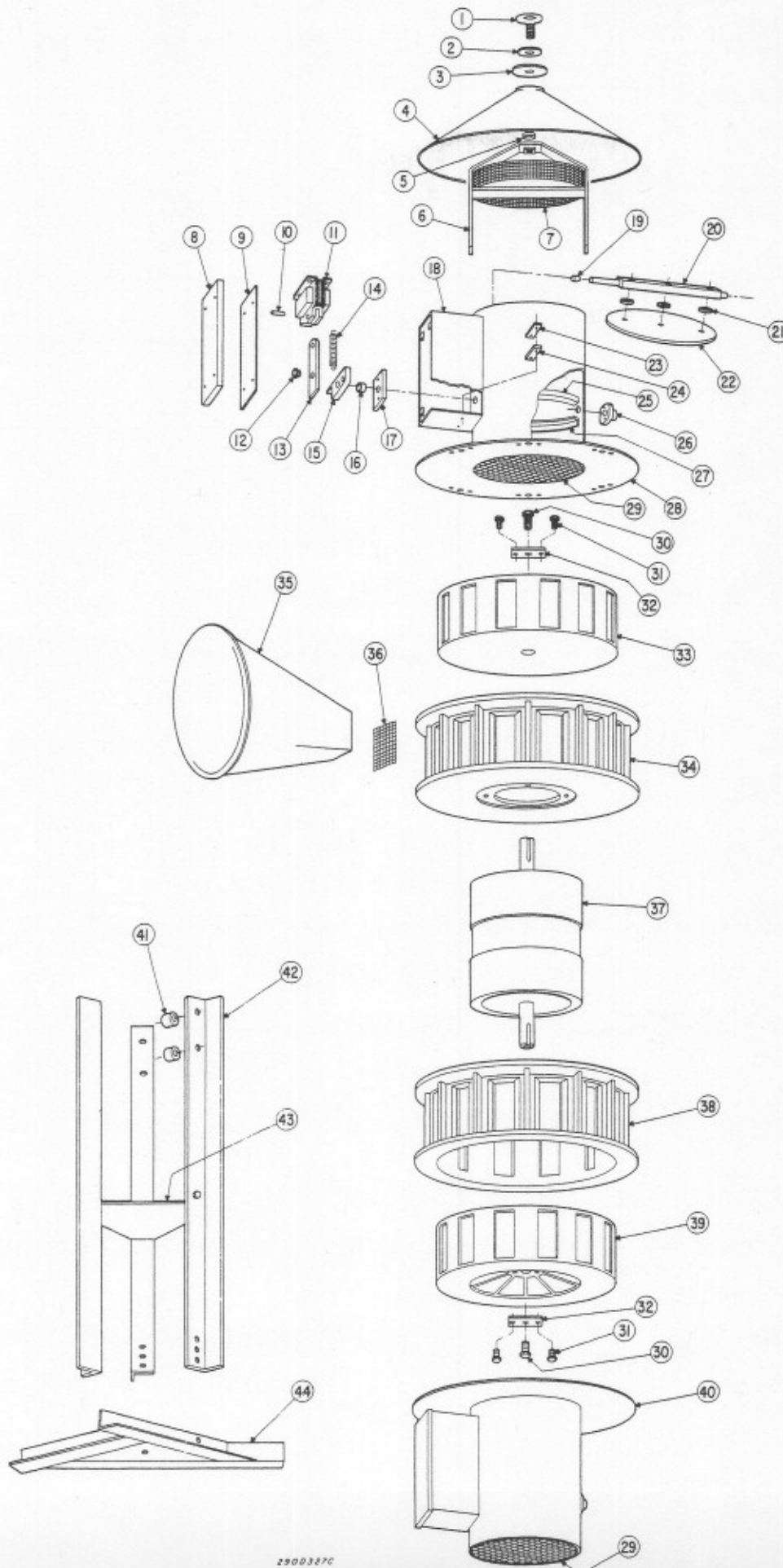


Figure 5-8. Model AF Timer Wiring Diagram.

**SIGNAL  
DIVISION**  
Federal Signal Corporation

**PARTS INDEX**  
MODELS  
2T22A & B  
3T22A & B



29003270

Figure 5-9. Models 2T22 and 3T22 Parts Index.



Index No.	Description	Part No.	Qty.
1	Eye Bolt, 1/2-13	7003A003A	1
2	Washer, Rubber	7072A038	1
3	Washer	7072A147A	1
4	Dome, Steel	8155B013-01-0Y	1
5	Spacer	8445A041	1
6	Bracket, Hoisting	8445C008	1
7	Screen, Top Intake	8445B047	1
8	Cover ( Model 3T22 )	8445C007	1
9	Gasket ( Model 3T22 )	8445B025	1
10	Pin, Roll ( Model 3T22 )	7091A014A	1
11	Solenoid ( Model 3T22 )	8445A036	1
12	Bearing, Link ( Model 3T22 )	8445A028	1
13	Link ( Model 3T22 )	8445A033	1
14	Spring ( Model 3T22 )	8445A034	1
15	Crank ( Model 3T22 )	8445B019	1
16	Spacer ( Model 3T22 )	8445A071	1
17	Bearing ( Model 3T22 )	8445A030	1
18	Box, Solenoid ( Model 3T22 )	8445D005	1
19	Spacer ( Model 3T22 )	8445A070	1
20	Shaft ( Model 3T22 )	8445B068	1
21	Washer ( Model 3T22 )	7072A148A	3
22	Plate, Damper ( Model 3T22 )	8445C009	1
23	Pad, Stop ( Model 3T22 )	8445A044	1
24	Stop, Rubber Bumper ( Model 3T22 )	8445A031	1
25	Stop Ring, Upper ( Model 3T22 )	8445B020	1
26	Bearing ( Model 3T22 )	8445B024	1
27	Stop Ring, Lower ( Model 3T22 )	8445B018	1
28	Intake Tube, Upper ( Model 2T22 )	8445C057	1 AR
	Intake Tube, Upper ( Model 3T22 )	8445C022	
29	Screen	8445C035	2
30	Bolt, Locking	8279A034	2
31	Bolt, Locking	8279A033	4
32	Plate, Locking	8279A026	2
33	Rotor, 12-Port	L131-01	1
34	Stator, 12-Port	8283D417	1
35	Projector	8445D006	22
36	Screen	8445A040	22
37	Motor ( Models 2T22A and 3T22A )	8445B086	1 AR
	Motor ( Models 2T22B and 3T22B )	8287B178	
38	Stator, 10-Port	8446D003	1
39	Rotor, 10-Port	8446D002	1
40	Intake Tube, Lower ( Model 2T22 )	8445C056	1 AR
	Intake Tube, Lower ( Model 3T22 )	8445C017	
41	Spacer	8445A041	6
42	Bracket, Angle	8450B015	3
43	Plate, Brace	8451C037	1
44	Angle, Roof	8450C017A	1
Not Shown	Roof Mounting Kit	8450C017A-01	AR
	( includes item 44 and miscellaneous hardware )		
	Pole Mounting Kit	8450C014-01	AR
	( includes items 41, 42, 43, and miscellaneous hardware )		
	Upper Intake Tube Code Mechanism Assy.	8445D073	1 AR
	( 3T22 ) ( includes items 8 thru 28 and miscellaneous hardware )		
	Lower Intake Tube Code Mechanism Assy.	8445D072	1 AR
	( 3T22 ) ( includes items 8 thru 27, and 40 with miscellaneous hardware )		
	Brush ( for single phase motors )	8283A342	1 set
	Spring ( for single phase motors )	8283A343	4

DO NOT ORDER PARTS BY INDEX NUMBER.

Give model, voltage, description and part number.

Refer to PARTS PRICE LIST ( Part No. 1001 ) for prices of parts.

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# **PARTS INDEX** **REMOTE CONTROL** **MODELS** **RC5A, RC5WA** **RC5B, RC5WB** **SERIES A2**

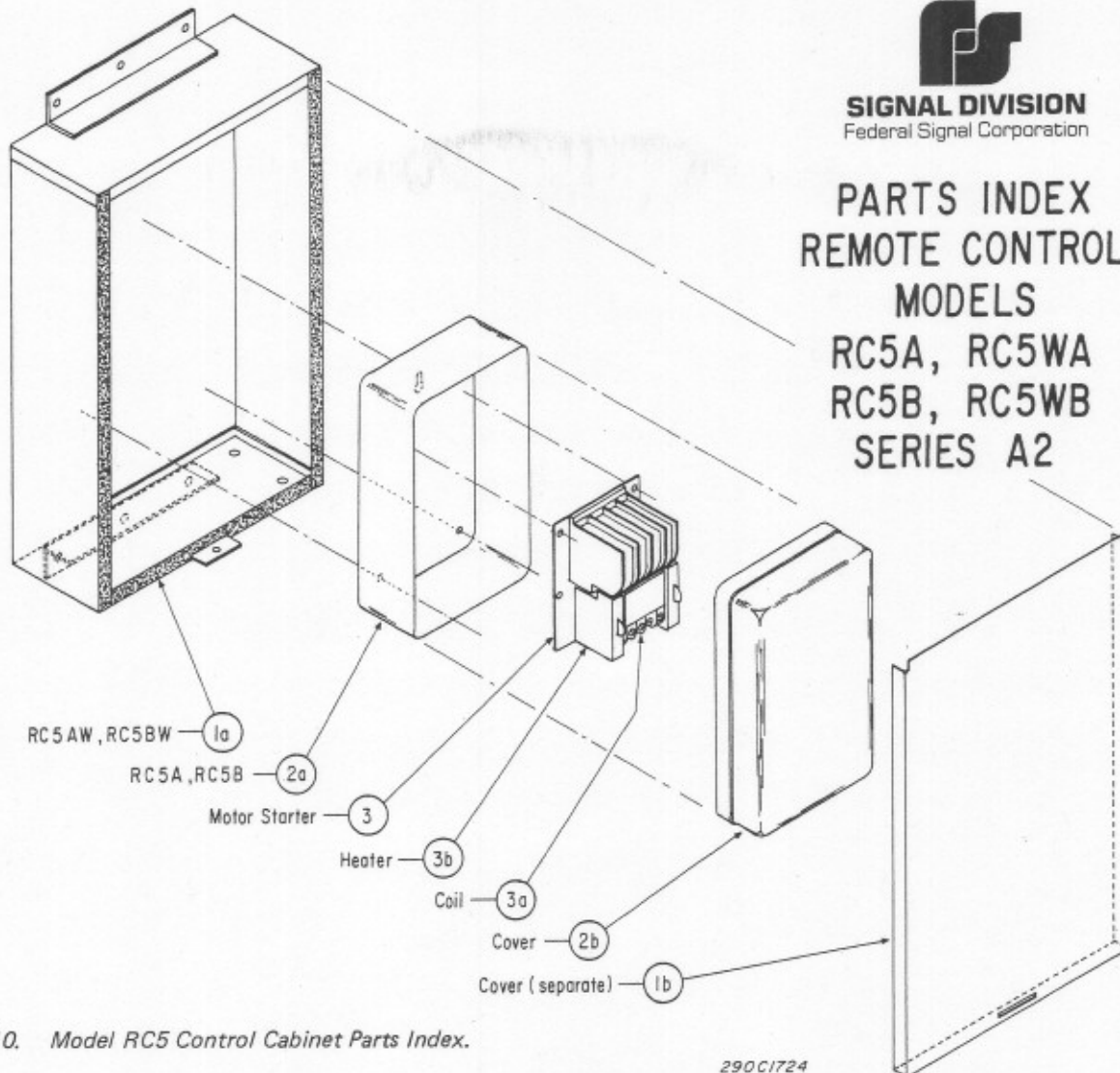


Figure 5-10. Model RC5 Control Cabinet Parts Index.

290C1724

PPL 0178  
PARTS LIST

RC5A, RC5WA, RC5B, and RC5WB  
Siren Remote Control

DECEMBER 1982

Item No.	Description	Ref.	Part No.	3 Phase		1 Phase	
				A	WA	B	WB
1a	Cabinet, Weatherproof		8247D002	0	1	0	1
1b	Cover, Cabinet (separate)		8247D002-02	0	1	0	1
2	Housing, Nema 1 (see ref. column)						
3	Motor Starter, 240V	**	8217C180	1	0	0	0
	Motor Starter, 240V	*	8217C180-03	0	1	0	0
	Motor Starter, 240V	**	8217C211	0	0	1	0
	Motor Starter, 240V	*	8217C211-01	0	0	0	1
	Motor Starter, 480V	**	8217C180-02	1	0	0	0
	Motor Starter, 480V	*	8217C180-07	0	1	0	0
	Motor Starter, 550V	**	8217C204	1	0	0	0
	Motor Starter, 380V	**	8217C180-01	1	0	0	0
3a	Coil, 120/240V		8217C180-16	1	1	1	1
	Coil, 240/480V		8217C180-17	1	1	0	0
	Coil, 550/600V		8217C204-17	1	1	0	0
3b	Heater, 240V, 1 Phase, K77		8217C211-19	0	0	1	1
	Heater, 240V, 3 Phase, K72		8217C211-18	3	3	0	0
	Heater, 480V, 3 Phase, K58		8217C182-20	3	3	0	0
	Heater, 550V, 3 Phase, K58		8217C182-20	3	0	0	0
	Heater, 380V, 3 Phase, K63		8217C204-20	3	3	0	0
Reference :				** Complete w/Nema 1 housing, coil, and heartr (s).			
				* Complete, open Type w/ coil, and heater(s).			

DO NOT ORDER PARTS BY ITEM NUMBER.

Give model, series, voltage, description, and part number.

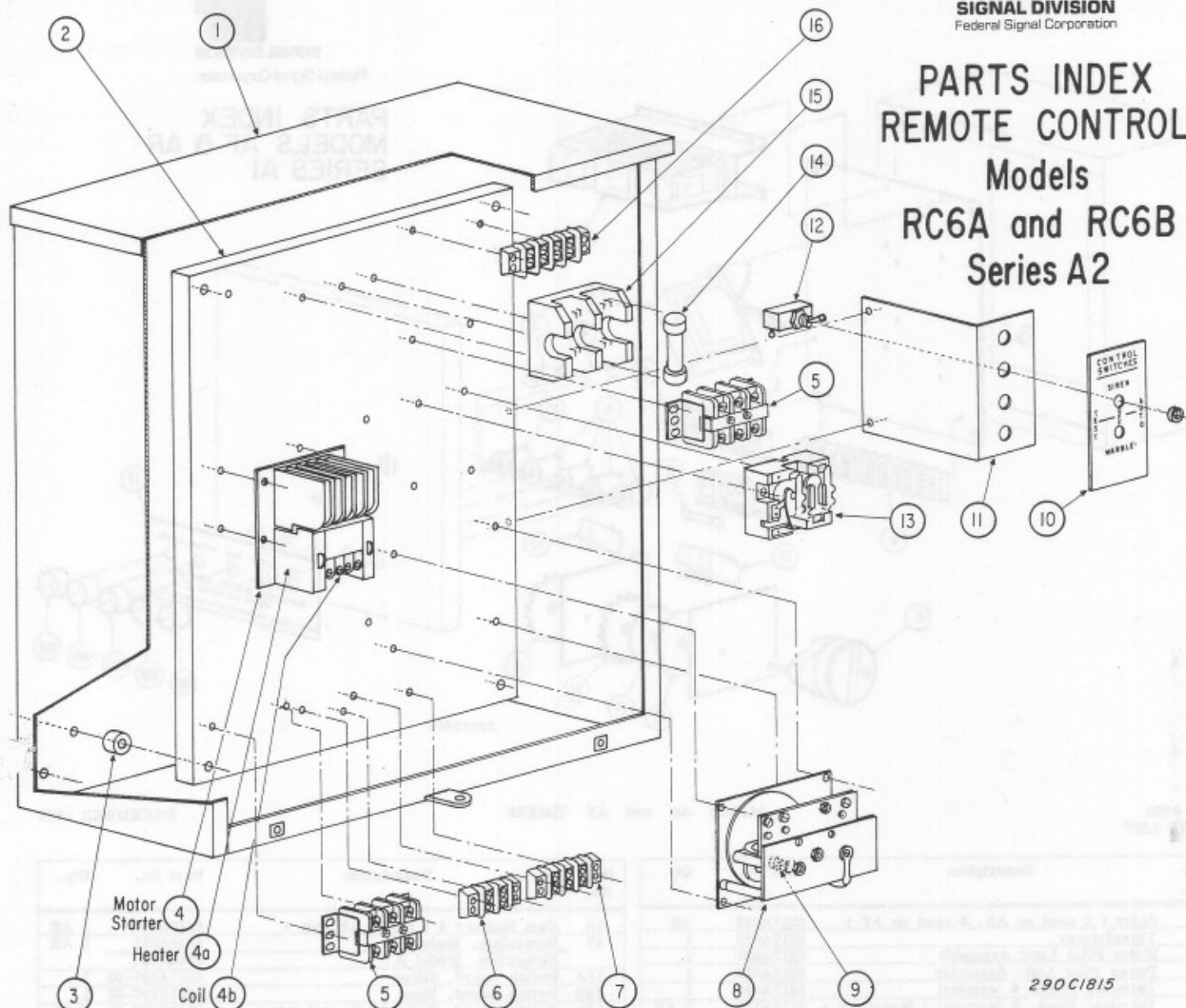
Refer to PARTS PRICE LIST (Part No. 1001) for prices of parts.

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# **PARTS INDEX REMOTE CONTROL Models RC6A and RC6B Series A2**



290C1815

PPL 0184  
PARTS LIST

**SIREN REMOTE CONTROL**  
Models RC 6 A and RC 6 B  
Series A2

DECEMBER 1982

Item No.	Description	Part No.	RC 6 A 3 Phase	RC 6 B 1 Phase
1	Cabinet, Control	8400D275	1	1
2	Panel, Control Cabinet	8445D059	1	1
3	Spacer	8440A050	4	4
4	Starter, Motor, 240V	8217C180-03	1	0
	Starter, Motor, 240V	8217C211-01	0	1
	Starter, Motor, 380V	8217C180-05	1	0
	Starter, Motor, 380V	Presently Unavailable	0	1
	Starter, Motor, 480V	8217C180-07	1	0
	Starter, Motor, 480V	Presently Unavailable	0	1
	Starter, Motor, 550V	8217C204	1	0
4a	Heater, 240V, 1 Phase, K77	8217C211-19	0	1
	Heater, 240V, 3 Phase, K72	8217C211-18	3	0
	Heater, 480V, 3 Phase, K58	8217C182-20	3	0
	Heater, 550V, 3 Phase, K58	8217C182-20	3	0
	Heater, 380V, 3 Phase, K63	8217C204-20	3	0
4b	Coil, 120/240V	8217C180-16	1	1
	Coil, 240/480V	8217C180-17	1	0
	Coil, 550/600V	8217C204-17	1	0
5	Block, Terminal	8283A885	2	2
6	Block, Terminal	8400A245	1	1
7	Block, Terminal	8283A902	1	1

Item No.	Description	Part No.	RC 6 A 3 Phase	RC 6 1 Pha
8	Flasher	8217A054	1	1
9	Coil, 240V ( for item 8 )	8217A066	1	1
10	Nameplate	8445A042	1	1
11	Bracket, Switch	8400B030	1	1
12	Switch, Toggle, SPDT Center Off	8283A871	2	2
13	Relay, DPST	8283A880	1	1
14	Fuse, ECN-10	8445A085	2	2
15	Base, Multi-Fuse Cut Out	8445A074	1	1
16	Block, Terminal	8400A244	1	1
Not Shown				
	Transformer, 480V Primary RC 6 A, 480V, 3 Phase 240V Secondary	8287A078	1	1

DO NOT ORDER PARTS BY ITEM NUMBER.  
Give model, series, voltage, description, and part number.  
Refer to PARTS PRICE LIST ( Part No.1001 ) for prices of parts.  
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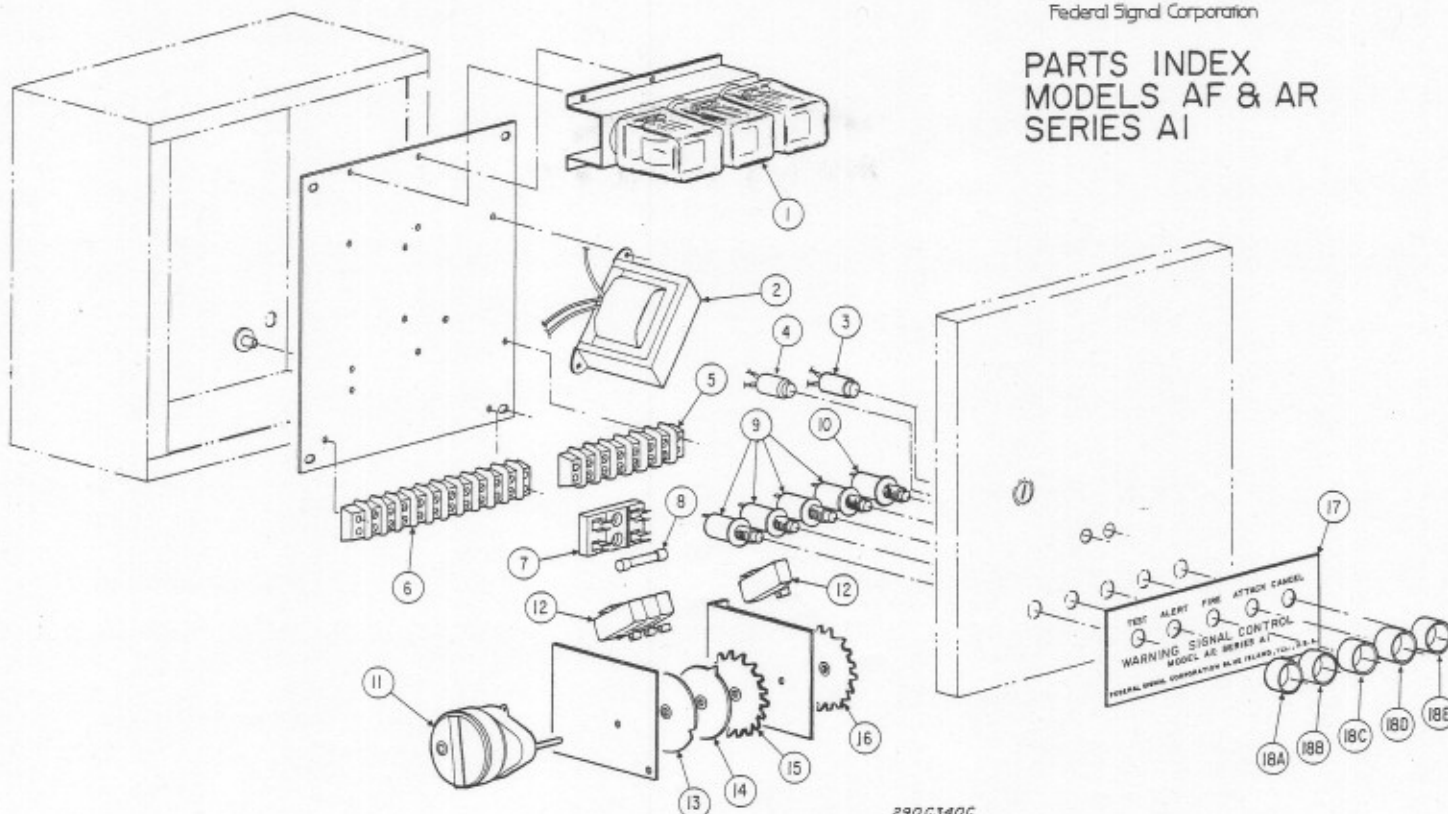
Figure 5-11. Model RC6 Control Cabinet Parts Index.





SIGNAL DIVISION  
Federal Signal Corporation

# PARTS INDEX MODELS AF & AR SERIES AI



290C340C

PPL 0060  
PARTS LIST

Models AR and AF TIMERS

DECEMBER 1982

Item No.	Description	Part No.	Qty.
1	Relay ( 2 used on AR, 3 used on AF )	8217A082	AR
2	Transformer	8217A083	1
3	Motor Pilot Light Assembly	8217A087	1
4	Power Pilot Light Assembly	8217A213	1
5	Terminal Block, 6 terminal	8217A086	1
6	Terminal Block, 9 terminal ( Model AR )	8217A173	1 AR
6	Terminal Block, 10 terminal ( Model AF )	8217A085	
7	Fuseholder	8217A091	1
8	Fuse, one ampere	8217A090	2
9	Switch, Red Push-button ( 3 used on AR, 4 used on AF )	8217A089	AR
10	Switch, Black Push-button	8217A088	1
11	Motor	8217A084	1
12	Microswitch ( 3 used on AR, 4 used on AF )	8217A081	AR
13	Cam Number 1	8217A092	1
14	Cam Number 2	8217A093	1
15	Cam Number 3	8217A094	1

Item No.	Description	Part No.	Qty.
16	Cam Number 4 ( Model AF only )	8217A095	1 AR
17	Nameplate, Model AR	8146A331	1 AR
	Nameplate, Model AF	8146A330	
18A	Switch Guard, Silver	8217A097-05	1
18B	Switch Guard, Blue	8217A097-03	1
18C	Switch Guard, Red ( Model AF only )	8217A097-01	1 AR
18D	Switch Guard, Yellow	8217A097-02	1
18E	Switch Guard, Black	8217A097-04	1

DO NOT ORDER PARTS BY ITEM NUMBER.  
Give model, voltage, description and part number.

Refer to PARTS PRICE LIST ( Part No. 1001 )  
for prices of parts.

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Figure 5-12. Models AF and AR Timers Parts Index